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A Case Study of Smart Cities: The Role of Stakeholder Commitment

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Abstract

This thesis examines stakeholders in IBM Smart Cities', and their commitment to the areas of sustainability and change management in combination with the impact of technology and innovation. Additional research case studies of City of San Jose and Ecovillage Thailand provide insights applied to the IBM case project. Although the amount of unstructured, non-scholarly practitioner contribution related to smart cities projects is growing, the main focus of existing scholarly research has been largely about the economic factors related to spatial dynamics of globalization and metropolitan urban migration or explicit skills-based knowledge. In the past decade there has also been a good deal of research related to the implications of the information age, increased connectivity and how internet and communication networks affect the development of global cities.

IBM's goal for smart cities was technology-centric rather than focusing on understanding stakeholder needs. These case studies provided a setting to research a more integrative approach that included stakeholder from experts to local people. My action research combined relevant IBM practitioner experience and the rigor of scholarly research with theoretical content and current academic theory to capture tacit knowledge to help understand how stakeholder commitment in smart cities provides change agency on smart cities projects.

I took a phenomenological approach to provide unique case studies of three different approaches to smart cities projects in the context of existing theoretical research of stakeholder commitment related to change management and technology innovation. From interviews, observations and artifacts, I gathered data for each case. The information was coded, analyzed, and interpreted as common themes for discussion.

An important aspect of this research was to learn the role stakeholders play in driving change and balancing the implementation of innovation and new technology, and to understand their influence on smart cities projects. To go deeper and understand the influence stakeholder commitment has on the project, it was important to research change models other than technology-focused projects and to interpret the human element as part of the encompassing view of the project.

Stakeholders may be government entities, elected and appointed officials, city workers, business partners, technology providers, local businesses, citizens, and more. Stakeholder

commitment can mean a shift in thinking from appealing to mass audiences to appealing to individual citizens ‘en masse’. I explored thematic experiences of stakeholder levels of commitment and discuss their influence on smart cities projects based on three case studies.

Action research provided insight to learn more about a participant’s approach and understanding critical insights from multiple projects. The format allowed for discussion of findings and led to implications and answers that, when applied on the IBM case project, improved process and outcomes. New methodologies for identifying and engaging stakeholders as well as their role of commitment on IBM projects were created.

My action research included studying who is working together, how they work together, and why they are committed to these projects as individuals and as teams to conclude that the role of stakeholder commitment:

- Explores data and information as knowledge
- Adopts technology and innovation as advantage
- Incorporates project planning and methodology
- Requires trans-organizational agreement and accountability
- Practices collective leadership approach and empowers individual change agency
- Embraces transformational paradox
- Uses education for inclusion
- Drives sustainability to improve quality of life

My research focused on acquiring new knowledge, understanding and exploring my research findings. This helped the IBM team to improve their project methodologies and processes, and cultivate stronger stakeholder commitment while driving toward their “smarter” vision and goal. New frameworks and methodological approaches were developed in practice and improved upon through multiple action research cycles. These were incorporated into practitioner methodologies and are available for future projects.

Chapter 1. Introduction

Globalization and urbanization are stimulating an economic investment for building out the infrastructure of cities (UNDESA, 2015; WHO, 2015). Stimulus funds are infusing the growth from government entities and corporate finance is increasing private spending related to urban infrastructure (UNSD, 2014; URIR, 2014).

Population growth in emergent sovereigns, aging population in developed nations, urban growth and impacted infrastructure, geo- and spatial planning, globalization and change related to global economics, crisis related to ecological and environmental sustainability issues, new technology and innovation, including information and communication technologies (ICT) all factor into the establishment of opportunity in the smart cities market (URENIO, 2012). Governments, cities, public and private entities are building new strategies and models to handle urban growth and incorporate technological capability to support operation of cities to be 'smarter' than traditional constructs (Allwinkle and Cruikshank, 2011).

IBM identified an opportunity to provide strategic thought leadership and transformation expertise to support the rapid growth of cities (IBM, 2010). These technology solutions fit under the umbrella of the IBM Smarter Planet initiative. *IBM Smart Cities* solutions were announced and brought to the market in 2008, and attained the first strong revenue growth in 2012 (Paroutis et al, 2014). IBM Smart Cities is a broad-scale initiative that consists of multiple product segments and services to implement change. The solutions continue to grow with industry-specific expertise to advance the IBM Smart Cities portfolio for public safety, smart grids, intelligent transportation, government services, energy efficiency, water management, healthcare data integration, education networks, smart analytics devices and software, and an intelligent municipal dashboard of management and operational services.

The central point of my research study is a core team in IBM Smart Cities' leadership practice, technology and product innovation, and project change management area. At the start of my research, IBM was focused heavily on technology and innovation as the key driver of smart cities solutions (Paroutis et al, 2014).

The IBM global consulting practice consists of software solutions teams of architects, technology specialists, project managers, and communication teams, who work with our clients to gain a better understanding of their challenges. IBM pursues Smart Cities as new business opportunity, often jointly investing on major projects, to transform cities infrastructure systems and operations. We engage large teams of experts to build repeatable solutions

containing intelligent modules, using the assets we own, often integrating with other companies' solutions offerings.

Objectives of My Action Research Thesis

My action research explored the role of stakeholder commitment (Doh and Quigley, 2014) as an influence factor to IBM Smart Cities' project success. This thesis report delivers theoretical and practical perspectives, including new insight and knowledge achieved through exploration of the following critical action research objectives during one IBM Smart Cities' project case and two external case studies:

1. Define the core concepts in this thesis: smart cities, stakeholder commitment process in cities, sustainability attainment
2. Identify the problem
3. Establish a framework based in theoretical and practical literature review
4. Define methodology including quantitative technique to garner deductive insight and conduct qualitative research as the primary method for data gathering
5. Analyze and identify insights
6. Apply cyclical change in the IBM workplace environment based on research insights
7. Provide discussion of the findings and developed practice
8. Provide conclusion
9. Identify emergent areas for new research based on findings

The action research was conducted as a holistic case study (Cronin, 2014; Yin, 2014; Eisenhardt, 1989; Scholz, 2002; Stake 1978) to provide a perspective of smart cities stakeholders in theory and practice for academic examination, reflection, and applicability in praxis. (See Figure 2.2 for an overview of my initial thesis model and Figure 3.1 for an overview of my action research cycles).

Key Questions for My Action Research

Overarching questions of my action research were:

- Who are stakeholders and how do they demonstrate commitment to smart cities?
- What are the factors that influence stakeholder commitment?

- How is stakeholder commitment influenced by leadership style?
- How is the stakeholder affected by crisis and change management?
- How does stakeholder orientation to technology and innovation influence projects?
- Are we considering the origin of the problems and the priorities of local stakeholders?
- Is there an optimal balance of change management, stakeholder management, and technological complexity?

Core Concepts and Definitions

The objective of this section is to examine the core concept of smart cities and define smart cities, stakeholders and the commitment process to achieve sustainability of smart cities as approached by academic research, and practitioners, particularly at IBM, my setting for this research.

Cities must change and improve (Hollands, 2013). Those that continue on the path of traditional inefficiencies, poor infrastructure, and power hierarchy of leaders without consideration of the growth and increased mass of population will struggle.

Although the roots of smart cities can be mapped all the way back to ancient Greece, per the concepts shared in Plato's philosophies of the Republic (circa 380 BC), today we need a very different model that addresses the global nature of opportunity, the rapid adoption of change in public and private sector organizations, the innovation of new technology (Korsten and Seider, 2010; Komninos, 2002) and the diversity of qualified resources.

Discussing my action research (Creswell, 2005) choice to examine stakeholder commitment in smart cities often starts with a question by colleagues and clients in other parts of the business who are familiar with IBM Smarter Planet initiatives. The question, "What is a smart city?" most commonly begins a conversation that develops into an in-depth discussion that can continue down several paths, depending on the vocation, interest and knowledge of the participants. It is a rich problem to address through action research and participatory evaluation and inquiry (Greenwood and Levin, 2007).

Smart Cities

Smart cities concepts and definitions can vary depending on the business model applied, the scholarly approach studied in academic studies, a specific technology focus, and the individual

bias from which it is defined. It can start from a perspective offered by an innovative and knowledge based economy, an initiative to improve urban infrastructure and citizen services, a need to solve geographic challenges posed from different parts of the world, or it may represent strategic or tactical interests of the defining entity.

In 2012, a group of researchers uncovered a “cacophony” of definitions of smart cities (Chourabi et al, 2012) and found that making a city smart is emerging as a strategy but “little academic research” has sparingly discussed the phenomenon and more conceptual work is required to define one consistent definition (Chourabi et al, 2012).

Table 1: Smart cities definitions

Source	Smart Cities definition
Hollands, 2008	Territories with a high capacity for learning and innovation, which is built in to the creativity of their population, their institutions of knowledge production, and their digital infrastructure for communication
Allwinkle and Cruikshank, 2011	Smart-er cities are based on the technology applied facilitating increased social, environmental, economic and cultural development
Smart Cities Council, 2014	A smart city is one which "uses information and communications technology (ICT) to enhance its livability, workability and sustainability" by "collecting, communicating and crunching data — within and across departments and third parties
IBM, 2012	A system of systems to drive sustainability through infrastructure, operations and people
UNDESA, 2015	Smart cities are made of the components that are integral to meeting the demands of rapid urbanization while sustaining life forms and resources in that environment

Table 1. A sample of representative definitions of Smart Cities offered by researchers and organizations

Smart cities as a concept can be inclusive of urban development initiatives (UNDESA; 2015; GEN, 2014), geo-and spatial planning (Foucault, 2008) and land use projects (Dillard, 1982), cloud technology, products and services used to manage data such as information and communication technologies (ICT) (Castells, 2000; Cisco, 2014), mobility and networking capital (IBM, 2014; Cisco, 2014; Hitachi, 2015), smart sensors and meters, smart cards that offer access to a plethora of social services, new simple computer infrastructures to the all connected internet of things (IoT) (Mohammed, 2015; Chaves-Diéguez et al, 2015; Cisco,

2014; Hawkins and Wang, 2012). Any and all of these concepts can be included in definitions of smart cities.

Smart cities often are referred to in other terms, as well. They can be referred to as smart cities, intelligent city, eco-city, cybercity, digital city, urban villages, ecovillages, eco-towns, sustainable urban districts (Bayulken and Huising, 2014; Burton, 2001, Komninos, 2002) and more. This concept includes alternative models that incorporate additional concepts defined by the priorities of the community, whether the focus is on ICT such as science cities and technopoles (Brooker, 2013; Castells, 2000;1994), or the rural urban villages, ecovillages, eco settlements, eco-towns that focus on sociocultural segments of the general environment (Dess et al, 2012, p.48).

There is no standard, approved industry definition for the term smart city, as one agreement remains in debate among scholars (Chourabi et al, 2014) and is defined in varied application settings by practitioners (IBM, 2012; Cisco, 2014). However, there are common themes in the definitions offered by the businesses that are building infrastructure, the scholars that are researching smart cities and specifically, IBM, the company at the center of my research focus.

Researchers of smart cities study the application of human resources, social capital, and the interconnection of economy, mobility, environment, people, living, and government. An urban area looking to be “smarter” is often improving the development of these areas to increase the quality of life for its citizens through strong human capital, social capital, and ICT infrastructure.

An early scholarly definition summarizing four key components of an intelligent city from a technological perspective, was provided by a professor of Urban Development and Innovation Policy, Komninos (2002):

- Application of a wide range of electronic and digital technologies to communities and cities
- Use of information technologies to transform life and work within a region
- Embedding of such information and communication technologies (ICTs) in the city
- Territorialization of such practices in a way that brings ICTs and people together to enhance the innovation, learning, knowledge, and problem-solving that the technologies offer

The expansion of technology and mobile devices, with access to the internet of things (IoT) (Chaves-Diéguez et al, 2015) and the category of information and communication

technologies (ICT) are influencing the infrastructure of smart city development (Kitchin, 2013) beyond conventional urban development of physical spaces for economic activity and dwellings (Yigitcanlar, 2015). Entrepreneurial development is arising from the optimization provided by big data collection and analytics.

Hollands (2008) struggled to find any one definition that could encompass all the concepts of a smart city and concluded that “smart-er” is a claim often made by the city itself to represent improvements of communications and information systems infrastructure. However, there are no specific metrics to measure the “smart-er” indicators. Hollands (2008) summarizes the term as, “territories with a high capacity for learning and innovation, which is built in to the creativity of their population, their institutions of knowledge production, and their digital infrastructure for communication” (Hollands, p. 306). The embedded technology doesn’t make the city smart but the application of the information derived from the technology and applied in economic policy related to human and social capital (Kitchin, 2014; Kitchin, 2013; Caragliu et al. 2009; Hollands, 2008) will make a city smart.

Years later, Allwinkle and Cruikshank (2011) attempted to define more clearly the terminology and meaning associated with “smart-er cities based on the technology applied facilitating increased social, environmental, economic and cultural development”.

In fact, most of the definitions offered by researchers in this arena (Allwinkle and Cruikshank, 2011; Caragliu et al, 2009; Florida, Mellander and Rentfrow, 2013; Hollands, 2008) define a smart city as an area that is operating within an interconnected system of infrastructure to increase economic sustainability, quality of life for citizens, and intelligent management of processes for operating efficiencies.

Practitioner definition offered by a project manager in India during an interview was simply, “a physical space for habitation by people and creatures that has the infrastructure required to provide economic support, sustainable environment, and a decent quality of life.”

The Smart Cities Council (SCC, 2014), a group formed by practitioners and experts from technology focused companies defines a smart city as,

“ICT is at the core of the Smart City. The Smart Cities Council defines a smart city as one which "uses information and communications technology (ICT) to enhance its livability, workability and sustainability" by "collecting, communicating and crunching data — within and across departments and third parties.” The council further states in its mission statement that, “A smart city gathers data from smart devices and sensors embedded in its roadways, power

grids, buildings and other assets. It shares that data via a smart communications system that is typically a combination of wired and wireless. It then uses smart software to create valuable information and digitally enhanced services."

In 2010, IBM Smart Cities was defined as:

Technological advances [now] allow cities to be "instrumented," facilitating the collection of more data points than ever before, which enables cities to measure and influence more aspects of their operations. Cities are increasingly "interconnected," allowing the free flow of information from one discrete system to another, which increases the efficiency of the overall infrastructure… To meet these challenges and provide sustainable prosperity for citizens and businesses, cities must become "smarter" and use new technologies to transform their systems to optimize the use of finite resources.
(IBM, 2010)

Even during my research cycle, the definition has been debated and evolved, as the concept is adopted and technology advances through innovation and implementation in city infrastructure. Smart cities are made of the components that are integral to meeting the demands of rapid urbanization while sustaining life forms and resources in that environment UNDESA, 2015).

In the Planning cycle of my research, IBM updated the definition of the IBM Smart City as a system of systems to drive sustainability through infrastructure, operations and people (IBM, 2012). This definition moved smart cities strategies from just a 'city' definition to apply to many areas whether regional, urban, suburban, rural areas and even large entities where systems, operations processes, service delivery to the public are improved by the application of new technologies and innovation, and the insights derived from these.

Suddenly, the concept of smart cities was applied beyond cities and high-tech regions to bring the concept to new areas for transformation, from rural African villages (GEN, 2014) in early development phase to the exclusive new Miami Dolphins complex (IBM, 2013), housing the stadium with surrounding commerce and residential developments.

The concept and definition of smart cities for the purpose of this research encompasses many of the above definitions that incorporate smart technology and innovation to support sustainability of the area by ensuring vitality and safety for residents and business in that area. I will use the IBM definition, "a smart city is a system of systems to drive sustainability through infrastructure, operations and people" (IBM, 2012).

Stakeholder

Stakeholders are often described as power individuals or power groups (Stacey, 2011), internal or external in origin, based on the pressure that they can exert and the influence they have on change and the challenges they can present when determining the acceptability of plans and expectations and the impact on the stakeholder power positions and cultural beliefs (Stacey, 2011, p. 74). Stakeholders are also the resources who create financial and economic value for a firm (Freeman et al., 2010; Harrison and Wicks, 2013). They exhibit behavior that builds value creation that is non-economic in nature such as strength of negotiation bargaining power (Bridoux and Stoelhorst, 2014) and have an increased ability to influence people.

A stakeholder can be an individual, a group, an organization, or any entity that has a direct or indirect interest as part of the value chain of a business interest (Carlsson, 2012; Moneva, Rivera-Lirio and Muñoz-Torres, 2007). Different stakeholders have differing interests and they can be at multiple layers of an organization contributing to the value chain. Stakeholder interests are multiple (Bridoux and Stoelhorst, 2014) and need to be managed as such. This requires engagement to determine the stake, the interest, the expectations, and the desired outcomes. Managing all stakeholder interests requires collaboration at many levels and functions of an organization (Pratt, 2013). Stakeholders are colleagues, collaborators, partners, vendors, contributors, participants, shareholders, or others who have a mutual interest in the success of a project.

Multiple stakeholders with similar objectives collaborate (Pratt, 2013; Sussind et al, 2003) to find their own way to contribute and enable leaders to better serve citizens in the rapidly changing business environment. Stakeholders across organizations use integrative thinking to consider alternatives, reconcile opposing thoughts, identify creative solutions with more alternatives and options (Lafley and Martin, 2013; Martin, 2007) to simplify the most complex problems. IBM defines stakeholders (IBM, 2015) as any entity that influences or is impacted by the scope of the project, the implementation, or one who measures the success or satisfaction of the results.

Commitment

Commitment has a generic definition after research by Moorman et al (1992) that can be a long-term wish to 'retain a relationship which is considered valuable' (Roxenhall and Andrésen, 2012). Organizational commitment is viewed as a multidimensional concept embracing an

employee's desire to remain in an organization, willingness to exert effort on its behalf, and belief in and acceptance of the values and goals of the organization (Mowday et al, 1979; Mowday, 1983; Morrow, 1983). The time element is often unknown so duration of commitment is often uncertain and deemed "until a project ends" (Atal et al, 2016).

Commitment relates to a valuable relationship (Roxenhall and Andrésen, 2012) between parties with similar goals. Extended further on the work of Morgan and Hunt (1994) and Dwyer et al (1987) commitment involves a willingness to make sacrifices in the short term in order to attain long-term benefits (Roxenhall and Andrésen, 2012).

Behavioral research studies link commitment to one or more of these three components:

1) Affective – commitment to common values, trust, benevolence and relationships
2) Calculative – commitment of an individual feeling more or less compelled to continue a relationship
3) Normative – commitment to a moral duty and a responsibility for the relationship to continue (Andrésen et al, 2012; Martin, 2008; Sharma et al, 2006; Meyer and Smith, 2000)

Gould's (1979) study of commitment linked moral involvement related to the internalization of values and goals may subsume commitment to job involvement (Gould, 1979; Morrow, 1983).

Morrow (1983) examined work commitment research of many forms including value focus and work ethic, career focus, job focus, as attachment and involvement, organization focus, union focus, and combined dimensions of commitment. Commitment to job can vary from commitment to organization and even the measure of career commitment is different according to research of Wiener and Vardi (1980). The development of commitment may involve reciprocal influence of attitude and behavior over time that evolves on the job and over time strengthen behavior of being committed to fulfilling goals of the role (Mowday et al, 2013).

Kidron's work (1978) showed respondents who expressed high moral commitment tended to also demonstrate high calculative commitment (Etzioni, 1961) and partially supports Dubin et al.'s (1975) findings that workers who showed a central life interest (CLI) in work per his CLI scale of 40 attributes had a higher commitment to their work organization and a higher level of attraction to specific features of their systems.

The generalized concept of individual commitment per current academic findings is relevant to this research as it is described as, ‘action that represents an attitude of attachment to the organization that leads to particular job-related behaviors’ (Mowday et al, 2013).

Stakeholder Commitment Process in Smart Cities

Stakeholder commitment is a measure in the format of a process (Karlsen et al, 2008; Jensen, 2001) defined by the stakeholder parties who initiate, drive committed activities through partnerships, and are accountable for the ongoing funding and development of the identified mission and objectives. Each stakeholder has an interest in the outcome of the project but the commitment is a measure of their level of engagement in partnership for the collective outcome of the project. To increase the stakeholder commitment to smart cities goals and initiatives across Europe the European Commission established the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) in 2012.

Partner stakeholders of EIP-SCC have grown from 300 partners in 2012 to more than 3000 in 2015 (EIP-SCC, 2015). These partners are engaged to make European cities smarter, more attractive and in doing so, developing business opportunity. These partners work together with city leaders, industry leaders and representatives of civil society to address issues, identify initiatives and drive commitment for funding, development and implementation of smart solutions in the areas of energy, utilities, ICT, and transportation (EIP-SCC, 2015).

According to the European Commission (EC), "the smart city concept goes beyond the use of ICT for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities, and more efficient ways to light and heat buildings.” (EC, 2015) This approach requires a more participatory approach, including interaction and a responsive city administration (EC, 2015) and an array of stakeholders who can ensure the needs of the residents are met.

As of 2014, stakeholders were grouped in the following clusters by the EIP-SCC:

- Business Models, Finance and Procurement
- Citizen Focus
- Integrated Infrastructures & Processes (including Open Data)
- Policy & Regulations / Integrated Planning
- Sustainable Districts and Built Environment
- Sustainable Urban Mobility (EIP-SCC, 2014)

"Mapping Smart Cities in the EU", is a report by the European Parliament's Committee on Industry, Research, and Energy that analyzed more than 37 European smart city initiatives and one of the 3 critical success factors was the people who are engaged on the projects. There needs to be, "the presence of inspiring leaders or 'city champions' who are able to foster participative environments, bringing together businesses, the public sector and citizens, with a focus on empowering citizens through active participation to create a sense of ownership and commitment". (Boulos, et al, 2015).

IBM Smart Cities is positioned in the IBM Smarter Planet initiative created to provide global sustainability solutions. (Palmisano, 2009). The commitment process in IBM Smart Cities is the establishment of relationships that are jointly acted upon by individuals or through partnerships defined and created by multiple stakeholders on a smart cities solution initiative (IBM, 2012). These stakeholders are trans-organizational and represent both public and private sector interests. IBM is not always the primary party managing the commitments, since projects are often funded, run, and managed by city leaders. However, IBM is very often the private entity accountable to track and measure the overall achievement of objectives made as part of the multi-stakeholder commitment process.

Sustainability Attainment Goal of Stakeholder Commitment in Smart Cities

In 1987, the Brundtland Report defined sustainable development as "development that meets the ends of present generation without compromising the ability of future generations to meet their own needs" (Brundtland, 1987; United Nations, 1987; Djurasovic and Knieling, 2015). The Earth Summit in 1992, was a public declaration for 'sustainable development as the most critical initiative of the next century, establishing a "new paradigm of society, economics and the environment" (Djurasovic and Knieling, 2015).

"Sustainability' has emerged as a universal methodology for evaluating whether human options will yield social and environmental vitality." (Basiago, 1995, p.109). Sustainability in relation to smart cities refers to the community being able to sustain a change of policy (Fuda et al, 2012), programs and initiatives that deliver improved economic, environmental and cultural programs. Physical areas may be urban, suburban, rural, and even regional focus areas where there is a capacity, governance body and day-to-day process in place to implement smarter technology and smarter services to support sustainability.

Sustainable communities would ideally deliver programs built that limit environmental degradation (GEN, 2014) and depletion of natural resources while including environmentally

sustainable initiatives. The objective of sustainability is to drive economies that minimize impact on natural environment, improve social services, increase safety (Allen, Karanasios and Norman, 2013) and create equality for all (Djurasovic and Knieling, 2015).

From the perspective of a smarter planet, this traditional opposition between nature and industry is not inevitable (IBM, 2010). It is being replaced by a very different paradigm, grounded in a new understanding of sustainability that is operational and economical (Dirks and Keeling, 2009), as well as environmentally sound (IBM, 2014) continuing to progress economic development but increasing the integration environmental protection policy efforts.

IBM Smarter Planet initiative addresses the seemingly irreconcilable demands of environmental stewardship (Palmisano, 2009) and reviving the world's economy. Globalization, population growth, rapid urbanization and a growing middle class are all driving competition for increasingly scarce resources, energy, water and raw materials. (IBM, 2010)

Our planetary civilization has grown to the point where it is beginning to jeopardize its natural life support systems (Basiago, 1995). "Sustainability' as a protocol had been crafted to guarantee the maintenance of the earth's resources... and is a methodology designed to maximize the vitality of social and environmental systems" (Basiago, 1995, p.119). For sustainability to be implemented there must be stakeholders attached to the objectives of sustainability in the form of commitment.

Table 2: Key concepts definitions

Key concept	Definition
Smart Cities	a system of systems to drive sustainability through infrastructure, operations and people" (IBM, 2012).
Stakeholder Commitment on a Smart Cities Project	The establishment of relationships that are jointly acted upon by individuals or groups through partnerships defined and created by multiple stakeholders on a smart cities solution initiative (IBM, 2012)
Sustainability	Sustainability is a methodology designed to maximize the vitality of social and environmental systems (Basiago, 1995)

Table 2 shows key concepts definitions used in my action research.

Identifying the Problem

The problem addressed in this research is to understand multiple stakeholders, their role and their commitment to smart cities and sustainability objectives. Specifically, the need to know what motivates various multiple stakeholders and what is important to them to work on IBM Smart Cities' projects early, and to ensure they stay committed for the duration to a successful outcome of the project, guided this research. Researching the role of commitment by the stakeholders and partnerships provides insight when we need to examine together and look at new ways the interconnected world has us work together.

If we don't have stakeholder buy-in or lose it while the project is in implementation phases, we face financial risk, opposition and conflict that can lead to delays and even project failure. At the same time, success could be measured differently by various stakeholders since each are in diverse functional roles with a spectrum of objectives and responsibilities, as well as influence factors of political, economic, social, cultural, or other nature.

IBM's early entry into Smart Cities' solutions was technology focused with a financial goal to grow IBM systems infrastructure in cities' settings rather than to focus on stakeholders. The environment for smart cities projects, as offered by an IBM business executive in the practice, is set among a city system that is, "actually a complex system of multiple systems that serve different purposes including governance, security, transportation, commerce, energy, utilities, education, healthcare, food, recreation, and more". IBM Smart Cities' projects are vastly different than previous IBM projects and require a different process, to acquire new expertise and experience, due to the enormous complexity and the transformational nature of these projects. This setting supports the rationale to conduct action research.

These solutions are not selling simple products for data in commoditized technology markets (IBM, 2012). Most of the Smart Cities' projects require new invention, cross-organization collaboration and innovation, and research and development specific to the uniqueness of the requirements of each project. Resources, systems and processes must approach each environment with flexibility and adapt to produce optimum outcomes. To support stakeholder business drivers and the goals of the city at the same time, the resulting solution should deliver competitive economic results while ensuring sustainability of the environment amidst rapid urban growth. To do this, IBM can stay contemporaneous to constant global change and technology solutions.

In observing the shift, IBM needed to go beyond single stakeholder management (Palmisano, 2009) and gain multiple stakeholder commitment to the smart cities prior to and during the project implementation. This is an issue because these projects break down traditional silos, organization boundaries and natural management barriers. IBM is no longer the key stakeholder responsible for carrying the success of the project outcome. It is no longer an IBM-only team owning, leading or even managing project. Instead, there are multiple stakeholders, combined leaders and teams bringing requirements from a composition of public sector, private sector, NGOs, institutions, industries and even individuals who are essential to successful collaborate across all or partial aspects of each project. These stakeholders may have roles as elected officials or NGOs who have constituencies with positions to support, private companies carefully monitored for their value through earnings, academic and research institutions challenged to make timely research achievements. Yet, IBM has major investments tied up into these projects that usually run over a long-term life cycle.

Navigating the complexity includes understanding the systems, policy, regulations, and the unwritten rules that lead to finding new ways to work across multi-stakeholder teams. Diverse teams should review the solution for repeatable components and best practices that can be adopted for future projects. However, the haste of due dates, deliverables and scheduled budget measures during a project leaves less time to gain outside perspectives and innovate new ideas in real-time, leaving a team ‘stuck’ following a pattern of familiarity to deliver the expertise they already know and not giving them time to take into consideration differing conditions of each project.

At project close, the expert team members go their separate ways and disband to new projects immediately. Ownership expertise, collaboration and contributor knowledge goes undocumented. Understanding what was learned about how to lead diverse teams to execute successfully on smart cities projects is critical to future project success and this knowledge vanishes if not captured while the team is in action. It would be valuable to the IBM Smart Cities’ teams to understand project participant commitment required on these projects.

This research could provide new ways the stakeholder aspect of resource allocation, management and gaining long-term commitment can be integrated into project planning and implementation phases. This insight would help to ensure diverse stakeholder participants on future projects, who notwithstanding their distinct goals, can achieve their objectives and still elevate their vested interest to apply the same level of commitment they have individually to achieve success for the integrated project in its entirety.

Background for Action Research This Problem

As practitioner, it was critical for me as a leader in my organization to develop strategic alliances with committed stakeholders' who could make an impact and improve the successful design and delivery IBM Smart Cities solutions. The desired outcome of my research was to gain insight, apply change on the IBM case project (Senge and Scharmer, 2001) to improve our practice approach, management, and delivery methodologies.

Additional insights from my research might offer general knowledge that could be applied in other sustainable city initiatives of all sizes. It is estimated that in 2050 approximately 65-70% of the world's population will live in cities (UNDESA, 2015; WHO, 2015). My research can make a critical contribution to improving these smart cities transformational projects that are supporting a sustainable smarter planet.

In my experience, although all of the concepts are critical, the most compelling part of the equation is the people, the citizens across the world involved in the change. I have seen smart cities endeavors bring business leaders, government officials, and civilian stakeholders together to create connection and collaboration for meaning-making (Paulus, Woodside and Ziegler, 2010) toward sustainable smart cities. Though they are often motivated by different goals and varying levels of commitment, it is clear that committed people are essential to making surmountable the goal of creating a better environment for every citizen.

A key area of inquiry involved studying how stakeholders in smart cities made sense of paradox (Hahn et al., 2014; Luscher and Lewis, 2008), how they work with complexity and uncertainty, boundaries, relatedness, and working through change (Grégoire, Barr and Shepherd, 2010; Luscher and Lewis, 2008, p. 18; Gioia, Schultz and Corley, 2000). The implications and desired outcomes of my research aimed to identify how smart cities projects provide knowledge about the balancing act required for change in a complex stakeholder environment.

My engagement as an academic provided me the opportunity to conduct action research (Creswell, 2013) ask questions, gather data from participants, interpret and identify the best practices to work with clients and partners, as stakeholders, on the "journey." My research for smart cities was not to focus on crisis management but to look at the broader model of projects that are proactive to incorporate efficiencies into the infrastructure that allow city leaders to lead through change, to introduce new innovation to help their city operate more

intelligently, and to evolve and adapt as they become more informed and able to act in real-time to meet the needs of their stakeholders.

My research revealed similarities built on theory and might contribute toward a prescriptive solution (Palmer and Dunford, 2008) or differences and complexities that require continuous adaptation (Dooley, 1997) for change as part of smart cities projects. Building on existing change management (Gill, 2002) and stakeholder management theory, it was important to offer insights into the application in smart cities projects. My research sought to add to existing research around stakeholder influence (Hart and Sharma, 2004) and these change management theories in application, action, and reflection (Weick and Quinn, 1999; Quinn, 1980).

My particular area of research focus included working closely with leaders, managers, government officials, private sector champions, and partners who are taking stakeholder and change agents roles (Caldwell, 2003) to envision, initiate, and sponsor the implementation of technological innovation by creating new business models and supporting change management on smart cities projects that require collaboration (Paulus et al., 2010) across public and private sectors for sustainable outcome.

It was important to understand the factors that determined prioritization of point projects (Kaplan and Tripsas, 2008) that make a city smarter, the process of defining levels of public-private stakeholder inclusion (Hart and Sharma, 2004), and how ownership positions, roles, and relationship models are defined (Jensen, 2001). To know the level of cooperation through collaboration, innovation, and decision-making involving a community of stakeholders (Brickson, 2005) will affect the best fit for considering individual or collective approaches (Eby and Dobbins, 1997) and metrics in an integrated “smart” operational city.

IBM Addressing the Practical Problem and the Business Opportunity

This section addresses the significant opportunity to grow IBM business in Smart Cities related to driving thought leadership, gaining market traction and capturing future pipeline, increasing the IBM platform technology footprint, gaining data insights, and increasing shareholder value through revenue attainment and profit growth. The market potential will continue to increase with the continued growth and urbanization of the population around the globe in the future UN, 2014; Urenio, 2012; ICLEI, 2014).

New research from the institute of Frost & Sullivan (2015) estimates the market opportunity potential to be approximately $1.5 trillion globally for the combined industry segments of energy, transportation, healthcare, building, infrastructure, and governance comprised within the smart city global market opportunity. This much financial value equates the opportunity with the 12th largest GDP in the world (F&S, 2015)

Analysts at Gartner Group (2015) forecast that, "increasing urbanization is putting unprecedented pressure on city mayors to constantly balance the challenge of resource constraints against environmental sustainability concerns…. 1.1 billion connected things will be used by smart cities in 2015, rising to 9.7 billion by 2020. (Gartner Group, 2015)

IBM has made a significant investment in this space and is interested in continuing to lead this high-growth market to expand business opportunities in constructing technological solutions toward smart cities. The IT opportunity alone in this market grew to approximately 60 billion dollars in 2014 (UN, 2014). Extended capability into the industry segments related to the integrated infrastructure increases the total value of the IT project (MandM, 2015; Gartner, 2015).

In 2013, Frost and Sullivan (IBM, 2013) named IBM, "Leading Game Changer in the Smart City Business" and identified IBM's integrated hardware, software and services capability as a leader in a competitive marketplace.

IBM was also named leading supplier by Navigant Research (2013) reporting, "IBM's commitment to smart cities has become a key component of its broader Smarter Planet strategy. Its continued investment in research and development (R&D), products, and city engagements has allowed it to maintain its leadership position despite the growing number of heavyweight competitors."

IBM is positioned well with current investment, partnerships, and projects to keep the thought leadership and increase revenue attainment from Smart Cities. A plethora of information related to smart cities is being created daily. IBM technology can leverage the value of the four Vs of the big data that is being generated: volume, variety, veracity and velocity to gain new insights and implement change. Enormous pressure is put onto governments and other organizations that struggle to be productive and efficient, yet strive to use the information available to them to be more innovative in problem-solving.

Our projects involve hours of discovery, assessment, planning, mapping, and sizing, but the software assessment for which our IBM sellers and business partners are paid occurs only

much later in the project. The projects and related business agreements and consulting of each situation is unique. If we are learning and changing our approach to improve product and solution delivery, it would be valuable to capture the tacit knowledge of the early phases of the project and integrate this experience to improve future projects.

Research is needed to gather data and interpret it for meaningful insight and outcomes that can provide knowledge regarding leader and stakeholder commitment to deliver successful smart cities projects. The intention of qualitative and quantitative methods applied was to capture the information related to an IBM smart cities case combined additional external cases ad make sense of it in the context of action research. External projects, independent of IBM's perspective of smart cities contributed to this study and findings from analyzing empirical evidence were incorporated into IBM's Smart Cities' current project case, project methods and models. Knowledge—explicit and tacit—is being generated on every project, but has not yet been captured or studied fully for a deeper understanding to identify where and how, when and why leaders can engage to make cities smarter.

To explore both the theoretical and applied perspective it was important to research the theoretical concepts in an existing literature review. More information about stakeholder commitment in my internal organization (Palmer and Dunford, 2008) and as part of my fieldwork with external organizations (de Laine, 2000) was revealed through inquiry and observation.

Chapter 2. Literature Review

This chapter examines the cycle of critical literature review that established a framework for the action research to be built on a foundation of theoretical and practical literature. The review values the diverse ontological and epistemological assumptions (Bartunek et al, 1993; Greenwood and Levin, 2007; Campbell, 1988) of the researchers before me and the varied methods that they applied to the array of findings available. Their work, reflection, and interpretation (Gummesson, 2003; Weick, 1999) provides a substantial foundation and a full body of literature that is related to the many complexities and aspects of this smart cities conceptual model. In my research, reflection on existing knowledge helped to derive perspectives and relationships of the many facets of smart cities projects. The insights from the literature review steered me to refine focus inquiry areas, see Figure 2.1, and provided suggestions of alternative methods (Bryman, 2008) and tactics to employ in my research.

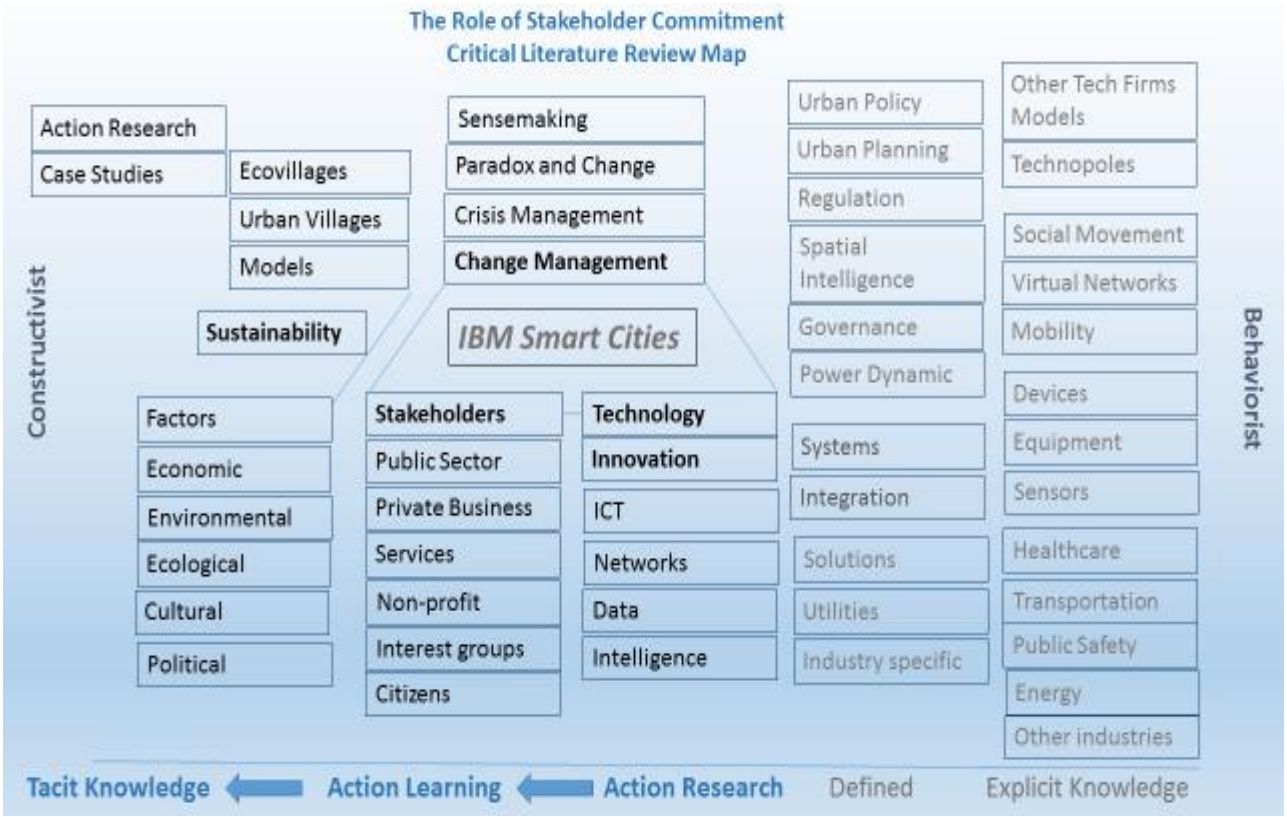


Figure 2.1 Critical Literature Review Map showing thesis action research focus

A Conceptual Framework of Smart Cities

The conceptual framework of smart cities extends across many areas of existing theory that are relevant to cities and contribute to the perception that a city is using technology to be smart. Existing research areas of technology and innovation, crisis and change management, and stakeholder management represent critical concepts and theory that can map smart cities infrastructure, operations, and people (IBM, 2012) development.

Rapid economic development is accelerating global urbanization (Rogerson and Rogerson, 2015; Zheng et al., 2009) and impacting the environment (Zhou and Zhao, 2013). The United Nations is tracking mass urbanization through economic and social metrics (United Nations, 2014). The World Bank reports that an estimated 1.2 million people around the world are moving into cities each week (UNDESA, 2015; WHO, 2015). Mankind creates 1200 exabytes (billion gigabytes) of data annually (IBM, 2012), and that number is growing. The transition from standardized services to citizen-centric services is in demand but the process takes time.

Chourabi et al (2012) outlined an integrative framework to understand the concept of smart cities because there is a lack of consistent understanding among practitioners and academia. The eight factors they identified include management and organization, technology, governance, policy context, people and communities, economy, built infrastructure, and natural environment (Chourabi et al, 2012).

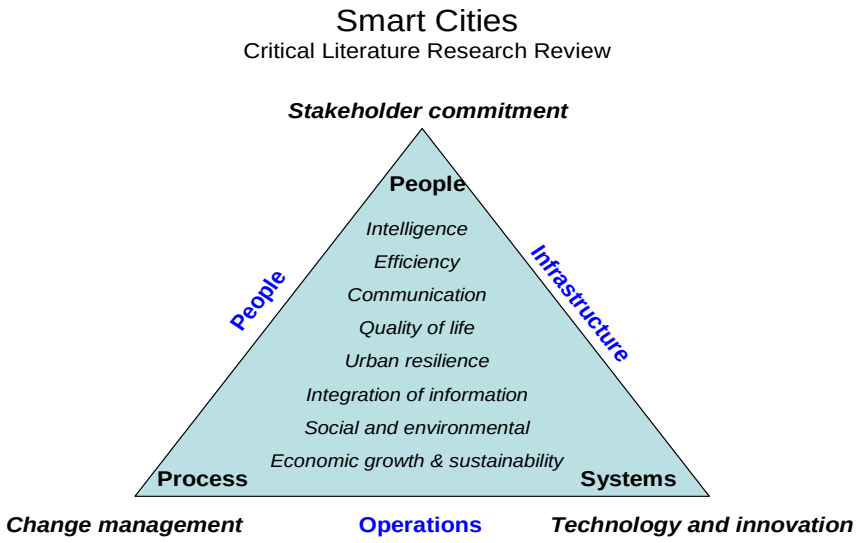


Figure 2.2. Smart cities–contextual framing of the existing research development triangle.

My starting point for an action research contextual map of the existing research with stakeholder commitment crowning the triangulation of the three theoretical concepts is illustrated in Figure 2.2. The level of commitment of stakeholders (Dooley, 1997; Lewin, 1947; Coghlan and Brannick, 2010; Stringer, 2007) and how the forces of crisis and change management (Chattopadhyay, Glick and Huber, 2001; Caldwell, 2003; Gill, 2002) and technology innovation (Florida, Mellander and Rentfrow, 2013) influence their behavior and decision-making on these projects (Rodrik, 2014; Ruttan, 2001) are key elements in my IBM Smart Cities action research setting.

A balance of leadership, change management, and integration of smart technologies can help control the complexity and create an environment where people, process, and technology are working together to create a smarter, sustainable environment.

My examination of existing related research and critical topics for review revealed that sustainability is a common goal across smart cities projects and three major areas of existing research are compelling to the fundamentals of a sustainable, smart city:

- Technology and Innovation: Systems
- Change Management: Process
- Stakeholder Commitment: People

Exploring stakeholder commitment in these three areas through literature review revealed the interconnection of systems, process, and people in relation to transformational smart cities projects as shared in future sections of this paper.

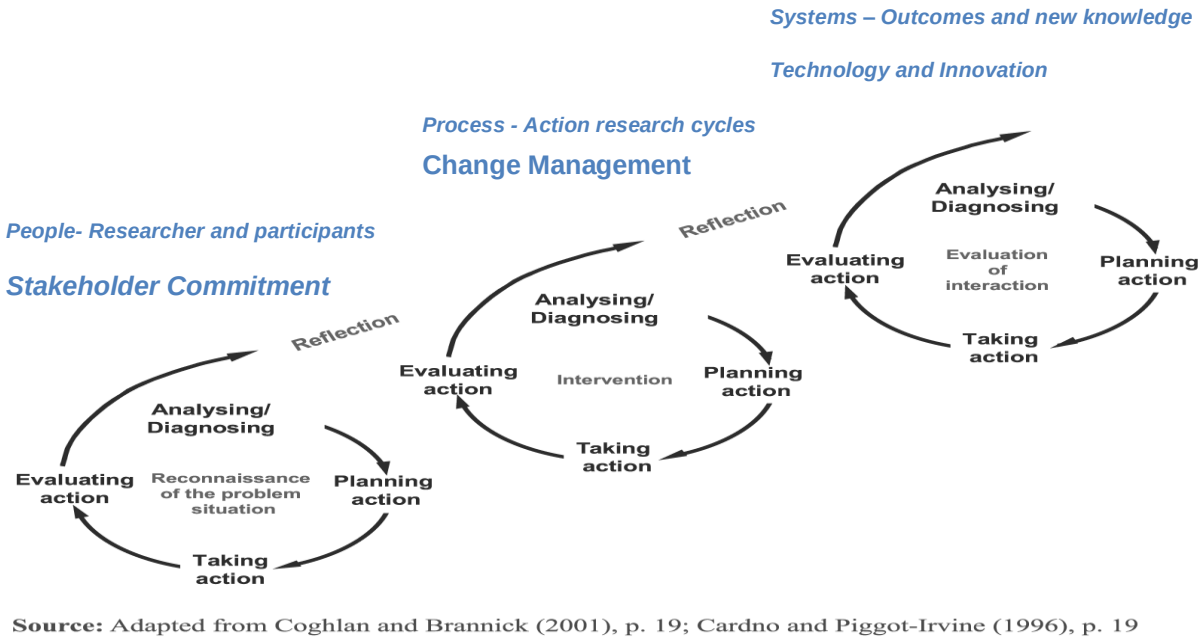


Figure 2.3. The adaptive cycles of action research align with the key concepts of my literature review and research scope: stakeholder commitment, change management, and technology and innovation.

The key concepts of my literature review overlay the diagram of my scope and action research cycles (Van de Ven and Poole, 1995) as depicted in Figure 2.3 with the starting point and consistent focus being stakeholder commitment. The relationship between the terms below and the problems they solve is as important as each component's part.

- Stakeholder + commitment where **Stakeholder** is the role and **commitment** is the humanistic behavior associated as action and reaction.
- Change + management where **Change** is the process and **management** is the humanistic behavior associated as action and reaction.
- Technology + innovation where **Technology** is the system and **innovation** is the humanistic behavior associated as action and reaction.

Although change management, technology and innovation, and stakeholder commitment are essential to ensure the success of smart cities projects, regardless of the size and scale of the project, people are at the heart of the experience (Chourabi et al, 2014; Carlsson et al, 2012; Caragliu et al, 2009). Their perception and participation is critical to the change. For this reason, I studied stakeholders and their relationship to the areas of both crisis management and change management and technology and innovation to extend the knowledge of current academic theory as it is applied on smart cities as a force of change to meet sustainability goals on smart cities projects.

Smart cities endeavors are created and supported by contractual agreements of business leaders, government officials, and civilian stakeholders together under a common mission to create connection and collaboration (Orr, 2013) toward sustainable smart cities. Stakeholders are motivated by several factors, including their existing knowledge and biases, leadership and management styles, different goals depending on their role, and varying levels of commitment.

Researchers and city leaders approach smart cities from many specific industry entry points such as transportation, water, energy, (Chourabi et al, 2012; Caragliu et al, 2009) and so on, to gain more knowledge about what systems and processes make a “smart city.” Interest is growing to understand how a smarter city can be developed. Sociologists are taking an approach to learn how “smart city” defines where and how we live and work (Davis, 2006). Technologists want to know what we can build into the system to enjoy the best quality of life and where services can be more efficient, effective, sustainable, and better meet the needs of the people (IBM, 2014; Cisco, 2014).

According to Fernando Prado, Managing Partner of Reputation Institute, (Rogers, 2013) for political, economic, and social reasons, a city also needs to be strategically “smart” and has a responsibility to manage its reputation as perceived by its stakeholder citizens, partners, businesses, tourists, and more to maintain the highest quality perception in four areas by:

- Direct experiences (with a country's physical landscape and infrastructure, for example, or its people and products).
- What a country says and does (through its branding efforts, public relations, marketing, and politics).
- National stereotypes (generalizations about a country's people and culture).

- What others say about it, particularly via traditional and social media. Successful management of reputation involves a coordinated initiative on all four fronts. (Rogers, 2013, p. 5)

Balancing the synergies established between stakeholder commitment, technology, and change is required through careful sensegiving and sensemaking (Weick, 2001). What themes can help support the synergy and triangulation and balance so that no single focus overpowers the others.

We have advanced so much since the time of the ancient Greeks, and yet from their contribution to knowledge we can always find relevance, the sparks of inquiry for new thinking, and solid grounding of our research in their philosophies and the views of the classics (Kilduff and Dougherty, 2000).

When I began the literature research for existing knowledge on smart cities, I was reminded of the origin of concept of education, considered an innovative approach 2500 years ago, from Plato and the Greek rise of civilization in his theory of “Dia Viou Paedeia” stating that education is “a means to enable citizens to contribute to the life and growth of the city” (Plato, 428-348 BC; Longworth and Osborne, 2010, p. 372).

Building my research on the existing theories offered in the triangulation of change management, technology and innovation, and stakeholder commitment, I looked to understand more about the conditions of the environment and the leadership characteristics of smart cities initiatives. The implications and desired outcomes of my research sought to identify how smart cities stakeholders’ level of commitment influences project outcomes to the goal of creating a better environment for every citizen obtainable. Therefore, my particular research area was framed to focus on the level of commitment of stakeholders on smart cities projects.

Sustainability

Smart cities are community models applied to various forms of a societal conscientious investment in time, process, and resources toward development and growth of habitation infrastructures. Smarter than earlier versions integrates collective (Eby and Dobbins, 1997) social capital principles (Jacobs, 1961) and supports the evolution toward sustainability models using new types of intelligence, governance, and management that can integrate social, environmental, and economic systems to improve the quality of life and enable citizen

engagement and participation with improved management of resources and participation (Caragliu, Del Bo and Nijkamp, 2009). The prioritization and approaches vary dramatically, but the conceptual core is to develop sustainable living communities in urban and rural settings.

Sachs (1980) documents the five dimensions of sustainability or eco-development as:

- Social (alternative growth, alternative vision of society)
- Economic (better distribution and management of resources, plus greater efficiency)
- Ecological (minimize the expectations on natural systems)
- Spatial (town-country balance, land planning)
- Cultural (range of local solutions that respect cultural continuity) (Destatte, 2010)

In an article about sustainable living, Destatte (2010) shares Sachs' (1980) list of requirements toward the pursuit of sustainable development:

- A political system that secures effective citizen participation in decision-making
- An economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis
- A social system that provides solutions for the tensions arising from disharmonious development
- A production system that respects the obligation to preserve the ecological base for development
- A technological system that can search continuously for new solutions
- An international system that fosters sustainable patterns of trade and finance
- A flexible administrative system, that has the capacity for self-correction (Sachs, 1980)

Quantitative research, simulations, and mathematical and systemic models (Peccei, 1969; Blanchard, 2010) have been built to identify the complex interaction of technology and global growth limits (Destatte, 2010). Over the last 60 years, the results of each of these reports have been examined, debated, and influenced by varied biases. Attempts to change methodologies and focus on specific aspects of the models led to modification where variables and parameters were changed, and more calculations were made to alter outcomes, all in an attempt to determine the effect of technology on growth and the behaviors of the world related to industrial output in relation to perspectives on global sustainability limits.

In 1970, an MIT study was conducted based on three principles of the future of the world from Aurelius Peccei's 1969 book, The Chasm Ahead:

- It is a fact that humanity and the global environment together are part of the same integrated macrosystem.
- Through observation, several parts of this macrosystem are at risk of decomposing or even being completely annihilated.
- There is a need to take action by developing a global plan and implementing it is a collective obligation for all organizations with the capacity to do so. (MIT, 1970; Peccei, 1969)

The 1972 conclusive report of the outcomes of the MIT study noted the following:

If the world is to avoid a disaster, a collective awakening of conscience is needed in order to restore the global balance. As such, the report believes that it is possible to alter these growth trends and to establish a state of ecological and economic stability that is sustainable far into the future. The state of global equilibrium could be designed so that the basic material needs of each person on earth are satisfied and each person has an equal opportunity to realize his or her individual human potential. (Destatte, 2010, p. 1577)

The discourse about the effect of technology on the world continues to generate new hypotheses and conclusions since the findings of the MIT report. Experts with different experiences and perspectives reacted (Blanchard, 2010; Worster, 1990) with their own models and alternate conclusions.

Viewpoints, discussions, and arguments continue and the ability to draw any single conclusion is not likely to be forthcoming as the debate continues to be influenced by both pessimistic and optimistic arguments (Meadows, Meadows and Randers, 2005; Maddox, 1973) related to the impact of technology and the global limits of growth.

Today, the developed world’s current approach to globalization, mass migration to cities, growth construction, and infrastructure development is built on a crumbling foundation of unsustainable eco-social paradigms (Gerber and Steppacher, 2012). The UN Millenium Development Goals (UN, 2015) update surmises that we cannot continue to build on top of an existing infrastructure that will eventually cause systems and civilization to collapse. We

cannot sustain the growth and the movement into cities at the current rate. If we continue on this trajectory without recognizing that we need to change the way we live, the rate of pollution of land and sea, scarcity of petroleum-based energy and other natural resources, over-construction and mass consumerism, over-population, and pandemic disease and health issues will continue us on our path toward the collapse of our civilization and the destruction of the earth.

It is up to all of us as global citizens (Edwards and Gaventa, 2014) to change and take action to integrate new economical, ecological, societal, and cultural elements into new social models of change for the citizens of the world. Citizens have always pushed leaders for increasing levels of services and enhanced livability of their cities (Collier, 2013). In the last ten years, citizens are increasingly demanding that government and civil leaders innovate to progress (Edwards and Gaventa, 2014; MacManus, Caruson and McPhee, 2013). World population is moving into urban areas, which places additional demands on services (UNDESA, 2015; WHO, 2015)

Strong leaders have responded over time, initially providing basic services such as walls and roads for security, systems for water and energy for convenience, and increased jobs and education to create opportunities. Yet, citizens continue to raise the bar (Edwards and Gaventa, 2014) because they see cities as the center of their quality of life and prosperity, and they seek support for their lifestyle, culture, health, and employment choices.

Current global economic uncertainty further fuels citizens' expectations (Edwards and Gaventa, 2014). Citizens can organize quickly and be outside city hall demanding answers and immediate action (Castells, 2010; 1996; Miller, 2006). They look to their city leaders as stakeholders who need to evolve and adapt to the changing environment and provide them with support and opportunities. With cities growing at an alarming pace and their perceived value for citizens, we can all expect that the 21st century will in fact be a century of cities (WHO, 2015). As the pace of social and economic growth is currently measured by indicators of free market growth, urban development, (Yigitcanlar, 2015) and other commonly espoused economic indicators of growth such as GDP (UNDESA, 2015; Golusin et al., 2014; Anderson and McGonigle, 2012), a great deal of emphasis is placed on how to build cities using a more sustainable model (Daly, 2013; Daly, 2007) and develop and scale them for the masses. It is also time to consider alternative community models.

Case Study Models

As part of the literature review, I gathered existing knowledge on the models in my cases specifically. Though I referred to the three cases specifically using the terms *IBM Smart Cities*, *urban villages*, and *ecovillages*, to represent their models, I used the general term *smart cities* when looking at the combined social construct (Richardson, 1997; Crotty, 1998) of providing new living and working models where ecological, economical, and social environments are incorporated into a model where information and intelligence support the achievement of sustainability and an improved quality of life. In alignment with the IBM definition, these cases provide alternative approaches of a system of systems to drive sustainability through infrastructure, operations and people (IBM, 2012).

IBM Smart Cities

Our planet is becoming digitally instrumented, interconnected, and intelligent. In IBM project assessments (IBM, 2010), these drivers help smart governments increase efficiencies and become more innovative toward sustainability. Too much information generated without being focused can be overload. It is key seek solutions to capitalize on the opportunity to get smart and gain an advantage from information and innovative IT.

- Technological advances mean that aspects of the operation and development that city managers have previously been unable to measure–and therefore unable to influence–are increasingly being digitized. This instrumentation creates brand new data points about, for example, the efficiency of a city's water or transport systems. In addition to being instrumented, different parts of a city's systems can be interconnected so that information flows between them. With the greater digitization and interconnection of a city's core systems, newly gained information can be used for intelligent and informed decision-making.
- People are moving into urban areas at unprecedented rates and current infrastructures cannot support the enormous influx (UNESCO, 2015). Many of these people have the skills and ability to contribute to the innovation and improvements required to provide for the city but have not been incorporated into the system as stakeholders.

IBM's contribution to creating smarter cities is becoming a reality in large, complex, real-time projects. Our approach is that we have some great projects, where people are "creating as they go," incorporating change and emergent influence (Emery, Calvard, and Pierce, 2013)

every day. Therefore, it is difficult to capture the expertise and experience from the team. Tangible assets can be created but more focus is needed on capturing the emergent innovation and the related tacit knowledge (Wu and Lin, 2013) from the experience and to contribute to existing knowledge as we analyze empirical evidence and gain experience.

Many companies offer products and point solutions for specific problems in a city ecosystem. IBM provides a high-level strategic framework, consulting services, and some very good software products that target specific components of point solutions. However, ownership, funding, adoption, partnering, and integration remain a large part of the opportunity equation.

While the concept of IBM Smart Cities may be clear: technology applied to achieve sustainable outcomes, actualizing the value can be too costly, the risk too high, and the scope of the work too challenging to make a project worthwhile. IBM's development and delivery is still early. We need to learn quickly and efficiently within the boundaries of public sector regulations and policy.

IBM Smarter Planet solutions are transformational in scope and are part of IBM's key corporate strategic objective to deliver 'sustainable prosperity' for the betterment of our world. My role at IBM is to create and continuously improve strategic alliances (Jakobsen, 1998, p. 27) with leading firms and business partners who can add value as part of the stakeholder community that is building and delivering IBM Smarter Planet solutions. Within the IBM Smarter Planet portfolio is the IBM Smart Cities (Al-Hader and Rodzi, 2009; Caragliu, Del Bo and Nijkamp, 2009) initiative. These large, complex projects span technology domains and incorporate a great deal of industry expertise. IBM as an enterprise does not want to be a sole owner of these solutions, but instead wants to influence and cooperate as part of an ecosystem of expert resources.

IBM does not want to be the expert in everything and therefore leverages the value of their various routes to market. The contributions of partners, integrators, and technology vendors coming together with a common goal for planning and delivery of solutions allows IBM to contribute as one key stakeholder among many. IBM drives the core of the operations, bringing together the instrumentation, interconnection, and intelligence of all facets of the solution and deriving insights from the collected data to support better decision-making in the rapid growth of urbanization; however, other key partners are required.

Demand is growing quickly for resources around the world to drive these projects. Though this is an early and emerging space (Zygiaris, 2012), learning who and what is critical to

actualization of a smart city develops our organization (Weick and Quinn, 1999) and improves our alliances (Jakobsen, 1998) to better prepare teams on future projects.

We know that change is the only constant in living (Kanter, Stein and Jick, 1992; Kotter, 1996), and cities are like organizations in that they must change in order to survive. Rapid urbanization is quickly leading to slum conditions (UNESCO, 2015; WHO, 2015), so the pressure is on city leaders (Davis, 2006) to change their business model and implement urban improvements faster than ever before. Public and private sectors have increased collaborative efforts to improve the planning and execution of operations by integrating technology and innovation toward change. To achieve the objectives of these projects, the people leading the change are integral to its success.

Urban Villages

The philosophy and principles of *urban villages*, developed in concept in Britain, were built on "well-designed, mixed-use and sustainable urban areas, with a sense of place and community commitment" (Aldous, 1992) and developed an adoption by cities with agendas to support new initiatives related to sustainability and urban living (Aldous, 1992).

In 2003, the Urban Villages Group shared the following description: For want of a better label we have called our proposed development model urban village. It is what continental Europeans would recognize as an "urban quarter"–a mixed-use neighborhood within a broader urban area. (Biddulph, Franklin and Tait, 2003, p. 174)

Most discussions about urban villages would be categorized as concepts, illusions of an ideal 'village', and planning of city segments with boundaries. In concept, urban villages are urban, affluent, modern, and contained (as opposed the sprawling and dangerous urban jungle), incorporating sustainability and containing a strong element of 'urban renaissance' (Biddulph et al., 2003). Urban villages provide smaller, self-sufficient neighborhoods as part of a larger city landscape. The concept was overused in England and the term actually lost its relevance to the concept as every new housing development began to label themselves as urban villages. As sustainability became important to urban planning, new labels replaced urban village.

Ecovillages

The ecovillages model incorporates the value of the skills and worldview of the peasant farmer and small-scale artisan. The Global Ecovillage Network (GEN) describes ecovillages as "communities or forms of human-scale settlements, rural or urban, striving to create models for sustainable living" (Gaia Trust, 2012).

Ecovillages incorporate social, ecological, cultural, and spiritual dimensions for a holistic approach allowing for personal development of the individual while living in group harmony.

According to the Gaia Trust, "They should not be a problem to be solved by the development planner, but an asset to be cherished. It is a model that offers citizens and communities worldwide the opportunity to ground our visions for more sustainable and joyful ways of living in our own places." (Gaia Trust, Dawson, 2012)

The ecovillage movement actually gained more traction through the communication made available by media and technology and the network has sustained itself through online interaction and education (Jackson, 2005; Jackson and Svensson, 2002). It is ironic that a movement that is based on simplification and small-scale technology has gained so much from using large-scale communication. The message exemplifies the fundamental power of technology is not innately negative but rather it is the application that matters. There are instances when scaling innovation and technology benefit the people of the world as experienced by the development of the ecosystem network for ecovillages.

GEN is now a large-scale network that has models and methodologies to communicate to their ecovillage members. They are leading the way as stakeholders committed to change by communicating and negotiating for ecovillage representation to governments, civil society, policy-makers, planners, and the general public. GEN is a recognized NGO member of the United Nations.

Change Management

To look at change in the context of smart cities we must first agree on a common definition and meaning of what change management is and what it is not. Change in smart cities is the

process in action or the result of the process that rendered a different outcome than the previous state. Change is not the tools or the people or the tangible assets; it is the intangible (UNESCO, 2015).

The problem with discussing change conceptually is that because of the nature of "change," actual change may not produce the same results. The best that we can do (Pettigrew, 1985) is to look for common themes and settings for change in smart cities and try to map them back to existing related research.

Strain theory (Barley and Kunda, 2004) supports the idea that ideology can enable a collective unit to cope with contradictory social forces until the inconsistencies are brought to light or social change occurs and a new ideology is born to replace the last one. Interest theory supports the idea that ideological change happens to support the interest of the dominant group (Barley and Kunda, p. 393). Both theories assert that change happens due to external influences in society and culture. Painter (1991) holds that public and private organizations are changing at an accelerated pace and they have no history to refer to for experience and learning. They are in the midst of the great change and with this change comes uncertainty and instability that presents itself as threat or opportunity.

Command and control (Allen, 2013; Wishart, 1997) as a management style can be enacted in response to change. However, my research did not focus on application of this style in the current realm of the projects, but focused instead on understanding the nuances of change process and with the relationship of stakeholder commitment and actions to managing change leadership in more emancipated, collaborative (Ansell and Gash, 2012) style models.

Kurt Lewin (1890 - 1947), a social scientist whose legacy is "the father of organizational development," made significant impact to business management based on his large body of research in the area of change theory. Lewin believed that to "truly understand something" you must "try to change it" (Lewin, 1947, p. 34). His means of doing so was through extensive field study and pioneered the development of applied theory in action research and action learning. Epistemology and ontological perspective, as well as interpretation (Gummesson, 2003) and reflection regarding change management, will have an influence on resulting theory and frameworks (Van Maanen, 1995) and applicability to an organization specifically. This research could affect future potential application or manifestation in a smart cities environment.

Palmer and Dunford (2008, p. S20) raise the question of ontological assumptions associated with the body of research categorized within the label change management. They map existing knowledge from many epistemological and ontological perspectives of change management into their framework of six perspectives of directing, navigating, caretaking, coaching, interpreter, and nurturing (Palmer and Dunford, p. S24) to the three organizational change phenomena of vision, communication, and resistance level.

Palmer and Dunford's research emphasizes the influence that the embedded assumptions (Sturdy and Grey, 2003) have on research in this field of study. Some smart cities projects can begin with a driving focus on vision and others are borne from chaotic dynamics and push to new management structures (Dooley and Van de Ven, 1999).

Schein's (1985) theory of change offers five evolutionary steps of change: evolutionary, adaptive, therapeutic, revolutionary, and managed (Vince and Broussine, 1996) as steps of change that can be mapped to parts of larger solutions and organizations.

Weick (2001) looks at change management as originating in storytelling and relating to a set of events and proposed change in *sensegiving* and *sensemaking* (Filstad, 2014; Gioia and Chittipeddi, 1991; Weick, 1988). Clegg and Walsh (2004) look at the perspective of an existing dominant mindset and moving through change by changing to a 'proposed' new mindset.

Vince and Broussine's (1996) research found that emotions and relations, including paradox, defense, and attachment, are key influencers on the dynamic nature of change in an organization. Vince and Broussine's findings can add insight as to how organizational members, through access and action at an emotional response level, impact change.

The definition of change management varies depending on the researcher's agenda, approach, and the predefined assumptions (Palmer and Dunford, 2008, p. S20) attached to the definition of the term in their sphere of study. *Change* is defined as a set of actions and taken to support the process of moving from one set of conditions in a business to a new set of conditions. It can be systemic, procedural, or even reaction to crisis without any preparation for the change. Change management, as we have seen then, is at best a process that incorporates a set of guidelines or rules for governing systems and people through actions.

A common theme explored in change management research looks at how change itself creates a set of circumstances that presents both threat and opportunity (Kovoor-Misra, 2009; Chattopadhyay et al., 2001) and introduces pluralism (Easterby-Smith, Golden-Biddle and Locke, 2008; Kilduff and Dougherty, 2000) as well as supporting the complexity created in paradox. One such paradox is the concept of learning to unlearn (Lewin, 1947) in order to adopt new perspectives that support the opportunity in change.

Lewin (1947) offered his structure model of three steps in change theory (unfreeze, change, and freeze) as exceptional instances captured in static clips that can be paused and viewed like moving picture frames, thus allowing an organization to stabilize after change and regain effectiveness and cohesion before the next change. However, in the same organizational environment, Tsoukas and Chia (2002) ask us to rethink our assumptions and consider change to be normal and constant as part of routine (Brown and Lewis, 2011; Tsoukas and Chia, p. 567) and always evolving based on human action that powers change.

Change can mean the threat perceived by “a new order of things” (Machiavelli, 1961) or unlearning what we have learned before. This can create a contradiction to the classics and existing literature, or an evolution, a change toward new thinking that is based on new insights and the constant development and the process of becoming (Tsoukas and Chia, 2002).

The relationship of crisis management at point of impact with change management can impact an organization focused in a public or city setting (Vale and Campanella, 2005). Paraskevas (2006) offers a complexity-informed framework designed as an effective crisis response system for an organization. Many aspects of his framework are applicable for the subsystem of a smart city project where crisis response as a complex system will be managed for the entity. However, there is an entire infrastructure to be designed and delivered beyond crisis management in order for the city to be “smart” for the economic, political, and social well-being of the citizens (Destatte, 2010).

To manage change, cities are like companies in that they must have a systematic change management approach (Duggan, 2013; Rogers, 2013). Depending on what they are doing, they need to be able to use the data and information gathered for analysis and to determine next action. It may be used for reputation, safety, efficiency, or to recognize new areas of potential innovation (IBM, 2012). They need to understand how they measure up and

determine how they are “emphasizing strengths and mitigating weaknesses,” as well as how they are perceived by current and potential stakeholders (Rogers, 2013).

Another model for structuring change that smart cities project stakeholders may incorporate into their learning organizational framework are the four steps to move from intuition, to interpreting, to integrating, and finally to institutionalizing (Crossan, Lane and White, 1999). “Organizational learning is a dynamic process” (Crossan, Lane and White, 1999, p. 532).

Change, like action learning (Pedler, 2008), encompasses an ongoing process to learn, develop, and progress to new outcomes based on the learning and ensuing actions. It is important that we are reminded where we come from and can discern where we are going (Kilduff and Dougherty, 2000, p. 778) in the process of going from one state to another, thereby being different after a progression of actions. Change management at multiple levels of the organization invites awareness, design, tailoring, and monitoring (Worley and Mohrman, 2014).

Interactive control of change requires all levels of management to pay frequent attention to all levels of the organization, including in-person discussions with outcomes that can be tracked and measured (Simons, 2013; Kominis and Dudau 2000). Interactive control systems help sensitize change leaders to environmental shifts and strategic uncertainties and allows them to modify change plans in the face of environmental factors while simultaneously assessing the need and vision for the change required (Simons, 2013).

Continuous balance of the process of engaging and learning is the new model of change and this requires an interacting flow of routines and cycles (Worley and Mohrman, 2014). Strategic control in change is taking action by adapting and anticipating constant change to both the internal and external environment (Pearce and Robinson, 2000). Though change theory still incorporates all the traditional change perspectives, it can no longer be viewed as having a start and end timeline but rather as a constant (Tsoukas and Chia, 2002; Carter et al., 2013; Worley and Mohrman, 2014).

According to Worley and Mohrman (2014), actions related to the management of change require continuous oversight, participation, and adjustment with the ability to balance four factors:

- Being aware of issues, environments, and situational factors
- Designing in flexibility and adaptability of engagements with individuals and teams

- Tailoring implementation and allowing for adjustment of routines
- Monitoring strategies and implementations for impact on desired outcomes

Change leads to environments that can be quite paradoxical (Vince and Broussine, 1996) in nature as experience and research has shown through examining structured yet open management, stability yet flexibility, recognizing the partnership of complexity and adaptability (Choi, Dooley and Rungtusanatham, 2001; Dooley, 1997), controlling yet shaping (Palmer and Dunford, 2008), anticipation but uncertainty, dominating defined systems yet empowered new mindsets (Clegg and Walsh, 2004), linear or multidimensional (Kilduff and Dougherty, 2000; March and Simon, 1993; Thompson, 1967).

Some organizations avoid addressing change and try to manage control of lack of pace of change through no action at all, considering inertia (Crozier, 1964; Kessler et al., 2012) to be easier than the threat that change poses (Chandler, 1962) but with smart cities projects change is inevitable. Change happens whether planned or unplanned, intentionally or unintentionally, depending on circumstances and environmental, societal, and political influence. It can be impacted by dependent and independent variables (Van de Ven and Poole, 1995) including the content and context of the change time, connections, and chronology of events, all with dependent and different degrees of situational impact.

Organizations try to define predictable change management (Taylor, 1960), defining direction in an organized plan that is structured to fit into existing controls and procedures. In most organizations today, change management means using the infrastructure that is in place to define and implement procedures and technologies to deal with ongoing change in the business environment and to profit from changing opportunities. Dooley (1997) declares this mechanistic approach to be flawed because it retains standard controls that are not effective to handle new change models required, thus creating the wrong change. Instead, Dooley offers that because change enhances complexity, it must be approached from an adaptive systems perspective that allows data findings and information to be processed and translated for better situational integration and effective results (Dooley, p. 72).

Although organizations can be chaotic, in a dynamic state of change, unpredictable, and non-linear, Dooley (1997) puts forth how these dynamics can trigger an evolution of behavioral change agents to support the complexity, revealing a new dynamic of adaptive cycles and

innovation (Jayanthi and Sinha, 1998; Orlikowski, 2000; Orlikowski and Gash, 1994) to meet the needs of the change in process.

The theory of sensemaking (Maitlis and Christianson, 2014; Luscher and Lewis, 2008; Weick, Sutcliffe and Obstfeld, 2005) as a critical role supporting the vitality of an organization and the process to adopt, implement change, and manage the organization at all levels is gaining support, particularly where risk can be mitigated by managing organizational influence (Weick et al, 2005). Sensemaking allows people in an organization to construct meaning from surprising or complex events that could be confusing to 'fit' into their perception of the situation. They can remove confusion through the action of sensemaking, which provides guidance to help them interpret events and issues that take place within their organization or outside (Bisel et al., 2014; Maitlis and Christianson, 2014; Cornelissen, 2012; Weick et al., 2005). Sensemaking has also proven valuable as a form of communication that reveals who to trust and when to trust various participants during negotiations and the change process that is underway (Kelley and Bisel, 2014).

It is equally important to recognize that paradoxes exist and are actually integral to the process (Luscher and Lewis, 2008, p. 222). Issues such as complexity, confusion, contradictions, conflict, and cognitive disorder (McKinley and Scherer, 2000; Galperin, Bennett and Aquino, 2011) can impede and debilitate an organization unless they are addressed and learning can come from them.

Luscher and Lewis (2008) studied the important role of sparring as part of the collaborative process of working through paradox (Jay, 2013; Luscher and Lewis, p. 227) and contributing to the sensemaking of the individuals who need to understand change problems, what the problem is, what it is not (Sandberg and Tsoukas, 2014; Weick, 2001), and how to work through the problems. Their model of interventive questioning (Tomm, 1988) to achieve sensemaking (Hahn et al., 2014; Luscher and Lewis, p. 228) elevates linear questioning of current logic of the problem to circular questioning of multiple perspectives and uncovering potential dilemma, to reflexive questioning and examining the implications and recognizing the complexity of paradox formed, and moving into strategic questioning and simplifying the solution to a "workable certainty," hence sensemaking of a problem (Golob et al., 2014).

It is through this process of addressing the issues and creating an outcome of understanding that the team can move beyond the linearity of single-loop learning to double-loop learning (Argyris, 1977; Gould, 2009), which allows for the inclusion of the human element necessary

for an organization to address change and the paradoxes of performing, belonging, and organizing (Luscher and Lewis, 2008, p. 222). As shared in Luscher and Lewis' findings, a manager has to be "willing to change…let and retain control" (Luscher and Lewis, p. 229).

In managing change, it is possible to address conflict with dialectic inquiry or with paradoxical inquiry (Bednar and Welch, 2009; Lewis, 2000). Dialectic inquiry (Heikkinen et al., 2012) focuses on moving through a process of confronting the issues and conflicts and improving the decision outcome. Paradoxical inquiry (Bednar and Welch, 2009) offers change agents participation in the understanding and sensemaking (Weick, 2001) toward collaboration and simplification of the complex problem to a workable outcome. Change agents and stakeholders are integral to the journey through the change and provide guidance and a means of coping with the change. Luscher and Lewis (2008) provide a view of organizational change through a paradoxical lens (Luscher and Lewis, 2008, p. 236) showing the interlock between the paradox of belonging in and the paradox of performing changing roles and relationships.

Linde and Linderoth (2006) suggest that applying Actor-Network Theory (ANT) to manage change in IT-related change projects might be a useful approach to incorporate sensemaking. They observed that ANT is probably best applied in the early stages of the project to help understand the problems through discussion and analysis, but their research did not conclude that it helped in any form of project management or implementation activity.

Pollack, Costello and Sankaran (2013) suggest, however, that ANT theory can be an effective part of the reflective process, and that the action researcher might look at where there has been more focus on sensemaking or theory/model building instead of testing (Pollack, Costello and Sankaran, p. 1127).

Activity theory is change management framework that can be used in complex project scenarios to improve or design more efficient information systems (Allen, Karanasios, and Slavova, 2011). Contribution and execution of activities needs to be integrated across multiple stakeholders. Using activity theory and other information-rich collaborative frameworks and tools allows stakeholders of many types, whether, "citizens, non-profit organizations, private businesses, foundations, academic institutions and local governments to make decisions together in order to realize a sustainable future for their communities" (Monteiro et al, 2015).

Pearson and Clair's (1998) change preparation model define a framework for change and "removing risk and uncertainty" (Paraskevas, 2006) in a crisis situation. Being prepared

requires building cognition for a crisis situation through enactment and taking any necessary actions to set a collective vision of sensemaking and role structuring (Love and Dustin, 2014; Pearson and Clair, p. 64) for an organization that may be struck by crisis. This crisis framework can be compared to Dooley's (1997) complex adaptive system (CAS) model, which plans for contingencies in the environment, having an understanding of the complexity, and having the capacity to handle integration and efficiencies (Dooley, p. 72).

IBM's Approach to Change Management

IBM's approach as a solution provider expanding technology in this area was discussed in detail in the IBM Smart Cities section of this literature review. In relation to change management specifically, IBM offers new intelligent systems and operational processes (Palmisano, 2009) for transformational change management in a smart city environment support evolutionary change (Schein, 1985). One IBM Smart Cities project may focus on water, another on transportation, another yet may focus on security and social services and even the integration of one or more of these factors as they relate to a city or entity.

Public and private organizations are dependent on each other to partner for progress to ensure smart cities. Yet their management of change and stakeholder decision-making seems to differ in the public sector versus the private sector.

Becoming a "smarter city" is a journey, though, not an overnight transformation. Cities must prepare for change that will be revolutionary, rather than evolutionary, as they put in place next-generation systems that work in entirely new ways. City administrations must decide what activities are core, and, therefore, what they should shed, retain or expand into. Not only that, cities must "assemble the team" – integrate their own administrations and work with other levels of government, especially country-level, as well as private and non-profit sectors. Cities must also take into account the interrelationships among the systems they are based on, as well as the interactions among the challenges they face. (IBM Institute of Business Value on Smarter Cities, 2013)

The premise for the IBM Smart Cities concept is to anticipate, prepare, and be proactive to apply the intelligence and information available across all the departments, functions, and interests of a city to prevent crisis, protect citizens, and build a more efficient structure to support society. This is not the type of change that most cities have experienced. Historically, most often cities are pushed into change from a position of crisis brought about by economic,

political, and other disasters that result in “a cluster of traumatic episodes, rather than a single disaster” (Vale and Campanella, 2005, p. 7).

Stakeholder Commitment

Knowledge production (Huff, 1998) is a process of incorporating collective experience and mixing diverse stakeholders who have differing levels of research and professional acumen as part of a community-driven approach. For smart cities, this collective experience requires incorporating change management and technology innovation for immediate and long-term results (Huff and Huff, 2001, p. S52).

Defined processes and interconnections through change are developed to drive sustainable growth, quality, and communication efficiencies that support the infrastructure. Carlsson et al. (2012) researched policies and infrastructure showing that “collaboration and interaction by a complex set of actors, private and public, consumer and citizen” (Carlsson et al., p. 17) is required to progress long-term change. These are stakeholders in smart cities.

Managers in both the private and public sectors gained increasing social and political power (Hope, 2010) up into the 1980s and 1990s. Earlier work across sectors used Critical Management Studies (CMS) as a way to conceptualize the process and give other stakeholders a voice and a path to influence (Alvesson, 1995; Alvesson and Deetz, 1996) new knowledge creation. The process is inclusive and serves the interest of the complete organization rather than a privileged few with power and control in the organization. A similar inclusiveness through action research (Creswell, 2013; Eden and Huxham, 1996) can be used to gain more knowledge on the process of stakeholder commitment.

Stephen Covey (1989) shares that an organization is “a complex ecosystem of multiple, interdependent parts both inside and outside its formal boundaries—and your stakeholders are its most important elements.”

According to Covey, “The process of building total stakeholder commitment is challenging. Stakeholders have needs in conflict: Employees want more pay, shareholders want higher dividends, and customers want lower prices and higher service levels. It is difficult for any stakeholder group–even departments within the same organization–to appreciate or

understand each other's needs and how they must all work together to maximize the long-term benefit for all. “ (Covey, 1989)

In anticipation of change management and technology adoption and integration there are likely to be many different priorities and interests depending on each stakeholder’s position in the evolving smart city value chain. Managing the stakeholders to gain and maintain their commitment is a continuous challenge because emotions can play a role in the change. Considering all stakeholders is not a representation of socially responsible behavior (Moneva, Rivera-Lirio and Muñoz-Torres, 2007, p. 85) but rather a vital step to ensure that their needs have been integrated into the strategic plan.

When developing and executing corporate strategies in business, it is both best practice and an obligation to ensure that stakeholder interests are prioritized above other interests (Moneva, Rivera-Lirio and Muñoz-Torres, 2007; Huff and Huff, 2001). To emphasize this more clearly, a company’s management and a leadership team’s most important relationship is with their stakeholders, and their actions must be aligned with stakeholder interests when formulating strategy and determining a company’s direction. This same relationship should hold true for cities. The leaders of the city have a commitment to their stakeholders (IBM, 2012, Cisco, 2010) to uphold their interests in the process of governing and managing the city.

The human element of any project is dependent on the contribution of people (Weick, 1999), the application of their knowledge, and their unique ability applied to create and develop a unified approach for all citizens. In 2008, a conceptual model for stakeholder knowledge partnerships was proposed by Metaxiotis and Ergazakis (2008) based on their focus on local government-stakeholder partnerships and two-way knowledge transfer. The authors suggest that developing a methodological approach for building successful stakeholder partnerships could be a future research focus (Metaxiotis and Ergazakis, p. 148) that is related to ‘knowledge’ cities.

Kim and Mauborgne (2005) assert that “Stakeholders need to know that their voices have been heard and that there will be no surprises. Companies that take the trouble to have such a dialogue with stakeholders will find that it amply repays the time and effort involved.” (Kim and Mauborgne, p. 139). Creating an environment of stakeholder commitment requires educating the stakeholder and engaging in open discussion about the adoption of the strategy and the change.

Dooley (1997) ties organizational leaders as stakeholders to change adoption practices in an organization, noting that the population will seek homogeneity and create a bias of opinion that relates to the 'genetic imprint' or tendencies of the influential leaders of an organization. This sensemaking (Weick, 2001) at the resource level can be reflected in an adaptive systems approach. Leaders build momentum through inspiration and drive, offering flexibility as a valued trait (Kirkpatrick and Locke, 1991) to making change happen through others.

Commitment can be exhibited by an adaptive leader (Caldwell, 2003) who creates a common language to manage the people and, in doing so, offers a vision of the change through a lens of shared schema, shared assumptions, and strategy (Kanter, 2011; Kanter 2004). Shared goals as tracked in the theory of teleology (Van de Ven and Poole, 1995) can create a common approach toward achieving a change strategy. Sproull and Kielser (2011) coined the term cognitive chunking for this process of finding and defining common organizational schema from existing building blocks based on the organization's perception of the change leader (Sproull and Kielser, 2011; Wyatt 1992).

Burke and Litwin (1992) link the leader's perception of their organization to decision-making and sensemaking. The committed leader extends the shared vision by altering perspectives of the individuals in the organization. Together they establish improved communication of this vision and improving related environmental, social, and political perspectives (Dooley, 2004 p. 69) of the organization. Inertia is the outcome of the behavior of humans, stakeholders in smart cities environments, not necessarily committed enough to take action (Chandler, 1962) or not knowing how to take action and feeling that there is no support in the environment to take such risks (Brockner and James, 2008).

Trans-organizational commitment in sustainable environments (Wirtenberg et al, 2009) can move a team away from a state of inertia. Collaborative adaptive management (CAM) is a framework to build capacity via stakeholder management (Monroe, Plate and Oxarart, 2013; Choi, 2007), and can provide guidance to enable key stakeholders and secure their commitment and engagement.

The individuals who are adaptable and can cope with the complex and integral process (Caldwell, 2003) that is associated with change in the organization fit into four classifications, according to Caldwell's (2003) conceptual model of change agency: leadership, management, consultancy, and team (Caldwell, p. 131). These are stakeholder roles (Monroe et al, 2013; Metaxiotis and Ergazakis, 2008; Wirtenberg et al, 2009) in smart cities models. Caldwell

positions these change agents at the center of the change aligned with the processes to drive the change. At all levels in his model, these change agents have a common characteristic in the ability to “initiate, lead, direct or take direct responsibility for making change happen” (Caldwell, p. 140). However, Caldwell cautions that there is no universal recipe for success even with the right people in roles across the organization. He presents his models as a heuristic attempt to conceptualize change agency but emphasizes that a challenge remains “of understanding the empirical complexity of the change agent role in an organization” (Caldwell, p. 141).

Change, leadership and commitment in an organization are identified in action (Beckhard and Pritchard, 1992). The influence of leadership is a sequential process affecting change readiness, and in turn, the commitment to change as opposed to the conventional belief that it affects both change readiness and commitment to change simultaneously (Santhidran et al, 2013). Kanter’s (1977) research contributed to the theory that some leaders take on change and crisis to demonstrate their ability to lead (Kanter, p. 178). Isabella’s (1990) work on evolving interpretations of change suggests that an individual manager’s influence changes as it evolves due to their interpretation of the situation.

The trialectic logic model of change (Carini, Livingstone and Palich, 1995), based in attraction, may uncover support for the approach for Weick’s (2001) sensemaking. Sensemaking in an organization can be used as a transformational method to engage stakeholders and gain commitment through action where they would otherwise be paralyzed from acting based on existing discourse, political agendas, ambivalence, and resistance (Piderit, 2000).

Gerasidi et al. (2009) examine the role of stakeholders as an important factor in water management planning, which is one segment of the smart cities technology model. They discuss the process of understanding the interest, expertise, and perspectives of different stakeholders and the value of articulating and gaining insight of the specific context of water problems. Their research also offers the effort taken by stakeholders to resolve the many competing and conflicting demands of the issue of water scarcity. The development of urban water management plans through stakeholder participation in the decision-making process showed areas where opinions diverged but, more importantly, where convergence subsequently allowed stakeholders to bridge the gap between their differences and to collaborate on common ground to resolve problems. The researchers share a mapping of the iterative participatory process (Gerasidi et al., p. 211) and conclude that public involvement is critical to the process and the cooperation of stakeholders within the administration ensures a

'reasonable' mix of adequate quantity and satisfactory quality in successful outcomes (Hawkins and Wang, 2012; Gerasidi et al., p. 219).

Public leaders who cultivate public support and citizen engagement are perceived to be more responsible and accountable and therewith gain a popular legitimacy and administrative authority (Wang et al, 2014; King and Stivers, 1998; Keeley 1984; Lowndes, Pratchett, and Stoker, 2001). Citizen engagement in urban sustainability projects can affect financial capacity when citizens gain a deeper understanding the policies, timing and conditions for planning, and related implementation stages of the changes (Wang et al., 2014, p 807).

The increasing instances of joint public and private sector sustainability initiatives adds a level of complexity involving multiple stakeholder groups and incorporates stakeholder funding and decision-making processes beyond public policy, budget and project management. It introduces multiple level so goals and often competing interests. This complexity has not been studied to understand how complex public and private stakeholder engagement leads to financial capacity for sustainability (Wang et al, 2014).

Thabrew and Ries (2009) discuss the applicability of their framework for stakeholder-based life cycle assessment (SBLCA) in planning and how it promotes "transdisciplinary learning and cross-sectoral stakeholder integration in phases of project cycles" (Thabrew and Ries, p. 445). Local stakeholders from different sectors and job responsibilities were involved in their village development and actively contributed to the life-cycle planning and implementation phases of this sustainable community development project.

The strength of these stakeholders showed that the local knowledge they shared in evaluating the status and understanding of current issues and analysis of future alternatives provided much-needed local insight and perspective. They had a grounded knowledge of economic, social, and environmental factors that could affect the specific sustainability strategies in play for their community. The model that was developed shared the valued differentiators from a conventional view of life-cycle assessment where the local stakeholders added political, economic, and social cost benefits and social impact, as well as the effect on resources (Thabrew and Ries, 2009, p. 448).

Stakeholder behavior is affected by the phase of change in the organization (Pauchant and Mitroff, 1988) and they influence the decision-making process. A particular stakeholder's leadership style or place in an organization (Love and Dustin, 2014) is integral to determining the change process. The level of stakeholder commitment in smart cities has not been

researched. Stakeholder theory offered by Vince and Broussine's (1996) research found that emotions and relations, including paradox, defense, and attachment, are key influencers on the dynamic nature of change in an organization. Exposing the resistance to change, various technological options, and multi-stakeholder opinions and approaches to the problem uncovers conflicts, issues, and paradox so that they can be addressed as part of the implications of the problem before setting a resolution in play.

Research theory of Brockner and James (2008) provides insight into understanding the mindset of leaders who are better equipped to adapt and operate with the leadership characteristics of resilience, overcoming challenge, and perceiving crisis as opportunity. These stakeholders have a tendency to be catalysts for change in an organization (Brockner and James, p. 95) and to extend their attitude of positive organizational scholarship (POS) to enable excellence in their organization. These leaders have behavioral manifestations that allow them to adopt a learning-oriented approach (Walters and Holing, 1990).

IBM's Approach to Stakeholder Commitment

Solution providers expanding technology in this area, such as IBM, work with organizational leaders and subject-matter experts who are key stakeholders to offer new intelligent systems and operational processes (Palmisano, 2009) for evolutionary change (Schein, 1985) in a smart city environment.

Figure 2.4 provides a view of how leaders must innovate across services to meet and exceed citizen expectations (IBM, 2015). They are reaching beyond city hall to collaborate and integrate public and private sector funding, stakeholder participants, and interests, enabling interconnections across systems to improve outcomes. Leaders are looking for new stakeholders who can help them drive sustainable economic growth and enhanced quality of life for citizens. These stakeholders include businesses that have domain expertise in one of the areas of entry and can bring the experience to support change in the city program through partnership.

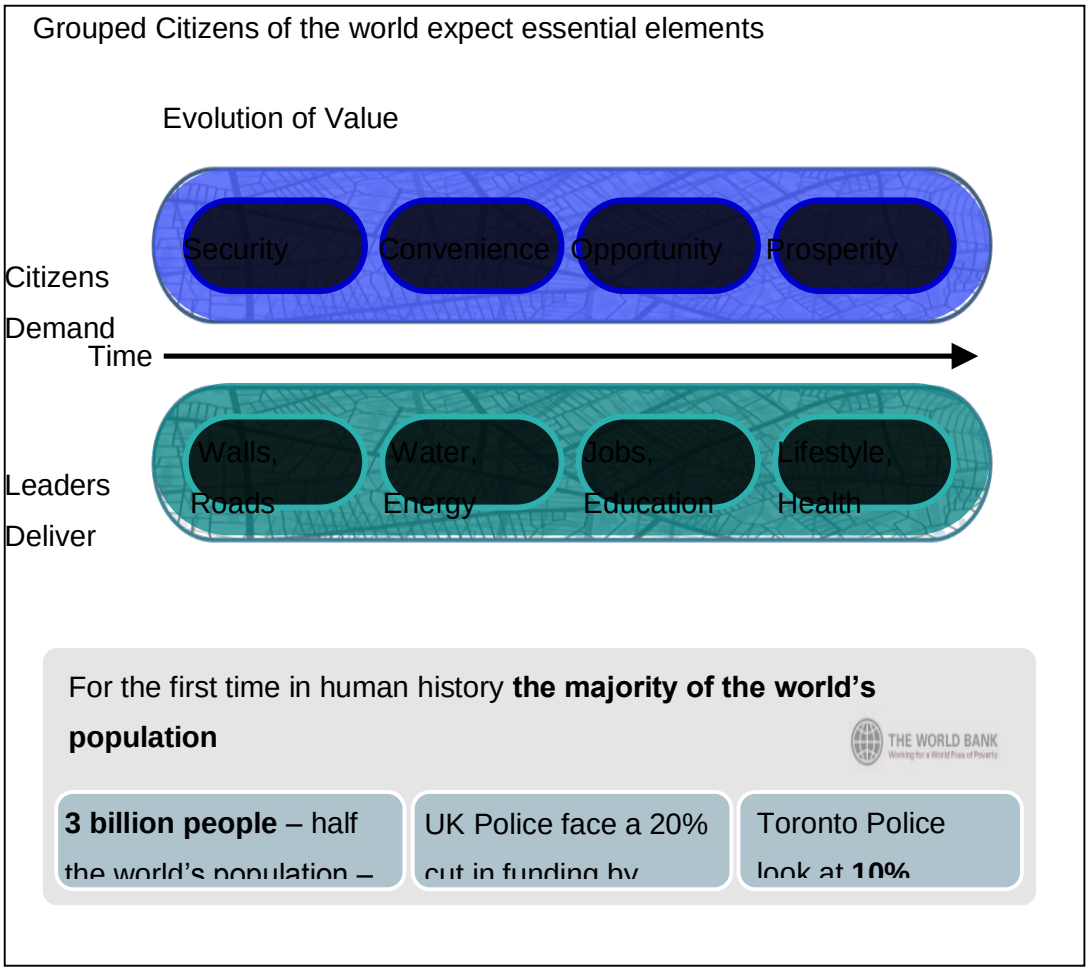


Figure 2.4. Citizens are placing increasing demands on leaders, who must find opportunity from today's harsh realities (IBM, 2010).

IBM works with city leaders to make progress in the new environment of skills and knowledge-intensive economic growth. City leaders who recognize and engage talent can utilize the diverse skills, knowledge, creativity, and innovation ability of all stakeholders as an ever more important driver of sustainable growth.

Technology and Innovation

The transition to providing more citizen-centric services (Cegarra-Navarro, Garcia-Perez and Moreno-Cegarra, 2014) across a city's core systems places new demands and pressures on a city and requires a deeper understanding of both the needs and the patterns of action within a city.

City infrastructures are currently inefficient and outdated. Cities consume an estimated 75 percent of the world's energy, emit more than 80 percent of greenhouse gases, and lose as much as 20 percent of their water supply due to infrastructure leaks (UNDESA, 2015; WHO 2015). Systems do not know what other systems are monitoring.

The advancement of technology is bringing about change that is rapidly transforming our living environments (Golusin et al, 2014; Kronsell, 2013). The living experiences of the individual and the greater population will provide input that leads to critical determinants regarding where, what, why, and how a city becomes smarter (Cretu, 2012). The definition continues to evolve and the processes and people engaged will need to keep pace with the change as part of the concept of cities becoming and staying smarter. City leaders are beginning to focus on how to leverage the vast amounts of real-world data collected (IBM, 2010) that record the macro and micro behavior of a city's people and systems

One aspect of technology in smart cities is the use of operations and management tools to support the change management discussed in the previous section. However, technology innovation refers to the subject matter expertise of hardware, software, and services that creates the basis for a smart city through applied use of the technology in the city environment. In these cases, for example, health and welfare, water management, transportation, and more, the technology is applied for urban infrastructure efficiency and is operationally driven.

In addition to the scope and complexity of these projects, public state and city budgets are being cut. Cities face budget deficits and even bankruptcy while populations continue to grow and congestion in cities is worse than ever. Technology solutions need to provide immediate short-term relief as well as longer-term plans for future organizational needs. The technology needs to be adaptive to continuous evolution and the change that is the nature of city operations (IBM, 2012).

City infrastructures are a set of interconnected systems with the "city" being an entity of citizens, whether local, state, provincial, national, or other. Cities have a mission statement and an organizational structure designed to fulfill the objectives of their mission. Smart cities initiatives are finding ways to streamline process and expense while providing better service outcomes for the community.

There are many industries, agencies, and interest groups within each city, and usually there are multitudes of old and new technology, compatible and disparate. The key systems that are

in place are prioritized in terms of importance to support overall city livability. At times they have been assessed for efficiency in delivering services to the citizens as well as the competiveness and ability to grow spurred on by the application of technology and innovation.

Many scholarly studies on smart cities examine the more concrete “features of the technology adopted to solve particular urban issues” (Komninos, 2015; Komninos, 2008), the management of the complexity of systems that run the operation of specific city functions such as Public Works, (Hawkins and Wang, 2012), or regional-based transitions (Zheng et al, 2009).

Technology and innovation (Leonardi, 2013; Watkins and Ehst, 2008; Orlikowski, 2000) are always evolving as more information leads to deeper insights and new decisions for new tools that comprise the infrastructure and manage the process. They are the intelligent systems and frameworks built for complex and adaptive systems that define and enable cities to operate “smart.” Related research focuses on the intelligence factor that makes cities smart (Deakin and Al Waer, 2011; Dirks and Keeling, 2009; Walters, 2011). Current smart cities cases (Gerasidi et al., 2009; Johnston and Clegg, 2012) concentrate study on the strategic technology planning aspects and technological frameworks (Cretu, 2012), including sensors, mobility and social platforms, and collaborative data.

Cretu (2012) defines the smartness of a city as “the ability to provide the infrastructure needed for the entities to produce, discover, understand and process events in real-time” (Cretu, p. 58) and sees events as instances that represent meaningful information to react to by taking an appropriate action. From Cretu’s perspective, technology innovation is the ability for a city to use an Event-Driven Smart City software system, which is a software platform and tools for all the registered entities (people, services, sensors, and devices) to be able to produce and react to events (Cretu, 2012).

Zygiaris (2012) details a conceptual level sustainability reference model for the process of smart city technology and innovation based on a “dense innovation ecosystem with extensive social interactions from a knowledge workforce that creates economic value through the acquisition, processing, and use of information” (Zygiaris, p. 223).

Another study offering new knowledge on integrated service device technology for smart cities (Lee, Phaal and Lee, 2013) states that multiple stakeholders engaged and the multiple interests of all participants added complexity and proved to be a difficult part of their process to cover in defining the roadmap (Lee, Phaal and Lee, p. 301). All interests would need to be

incorporated for current and future technological consideration and would therewith introduce parallel mapping. The authors chose one sequential order map that represents a more generalized, standard approach. Due to stakeholder consideration and the complexity that this introduces, application of this roadmap into future projects may need to consider more delivery customization (Lee, Phaal and Lee, p. 302) versus this general R&D process approach. So it could be assumed that change management and technology innovation, when viewed as process, can be conceptually and scientifically defined in a roadmap. However, the insertion of multiple stakeholders and various commitments requires more specific interpretation and understanding of human behavior and could have an impact on this technology-driven roadmap.

A key challenge at any given time is to understand the hundreds of entry points of the smart city technology, knowing where to get started, and how to drive a plan to incorporate the technology before it evolves into more advanced technology. Change is happening at such a rapid rate with the research and development of new sensor capability, water treatment science, solar panel cells and alternative energy advances, and so on.

Technology is integral for:

- *Planning and management* that brings together a plan that has a city realize its full potential–for citizens, for business–all while operating efficiently day to day.
- *Infrastructure services* that deliver fundamental city services that make a city livable. This makes a city work for citizens and businesses, including areas such as water, energy, transportation, and environmental services.
- *Human services* that provide services that support the citizen's needs as an individual, including Workforce Services, Social Services, Health Services, and Education.

Many large firms are entering the market with fully-integrated system delivery models, including platforms and architectures that are based on their business strategy and expertise. Cisco (Cisco, 2014) outlines their version of a smart city business architecture with a bias to a fully-networked environment for communication and data integration (Appendix L). Hitachi (Hitachi, 2015) recently provided a smart city model, intended to represent their holistic systems of an integrated services delivery approach addressing multi-layer requirements, software for data and hardware for sensors, and simplifying the complexity to make it all work together (Appendix M). Siemens Infrastructure and Cities uses a Smart Grid Architecture

Model (SGAM) that allows power supply companies to validate, configure and standardize smart grid projects (Appendix N). (Siemens, 2012; Urenio, 2012).

IBM's Approach to Technology and Innovation

IBM has a defined Smart City architecture that shows where and how the technology is effective and efficient in managing city operations. IBM has hundreds of business partners who build their technology on top of our architecture, thereby defining access points for their technology to plug into the bigger ecosystem for smart cities.

IBM Smart Cities' technology addresses individualized services that citizens are demanding of their elected officials and city management. Because integration across agencies and departments needs to be seamless to the citizen, greater complexity and interaction between the communications and information systems is required. IBM also provides innovative solutions across many industry sectors and services to meet the increasing needs and expectations of citizens. Continuous innovation is critical to streamline services delivery, optimize scarce resources, manage costs, and deliver improved outcomes.

In June 2011, IBM announced the Intelligent Operations Center for IBM Smart Cities. This solution provides a foundation from which leaders can build and expand their ability to become smarter. The Intelligent Operations Center has a programmable model for multiple entry points. The technology provides a hub for a single services area that is scalable to grow and embed additional services areas to leverage, anticipate, and coordinate and grow the interaction across multiple city functions. It allows streamlining of city operations to remove current inefficiencies that require managing multiple services. This operational hub is intended to maximize the information intelligence of multiple services and create better outcomes for citizens. City leaders can essentially start where they have the most critical need, whether public safety, transportation, energy and water, social and health or other services, to improve the management of their city and expand to additional areas for an integrated solution approach.

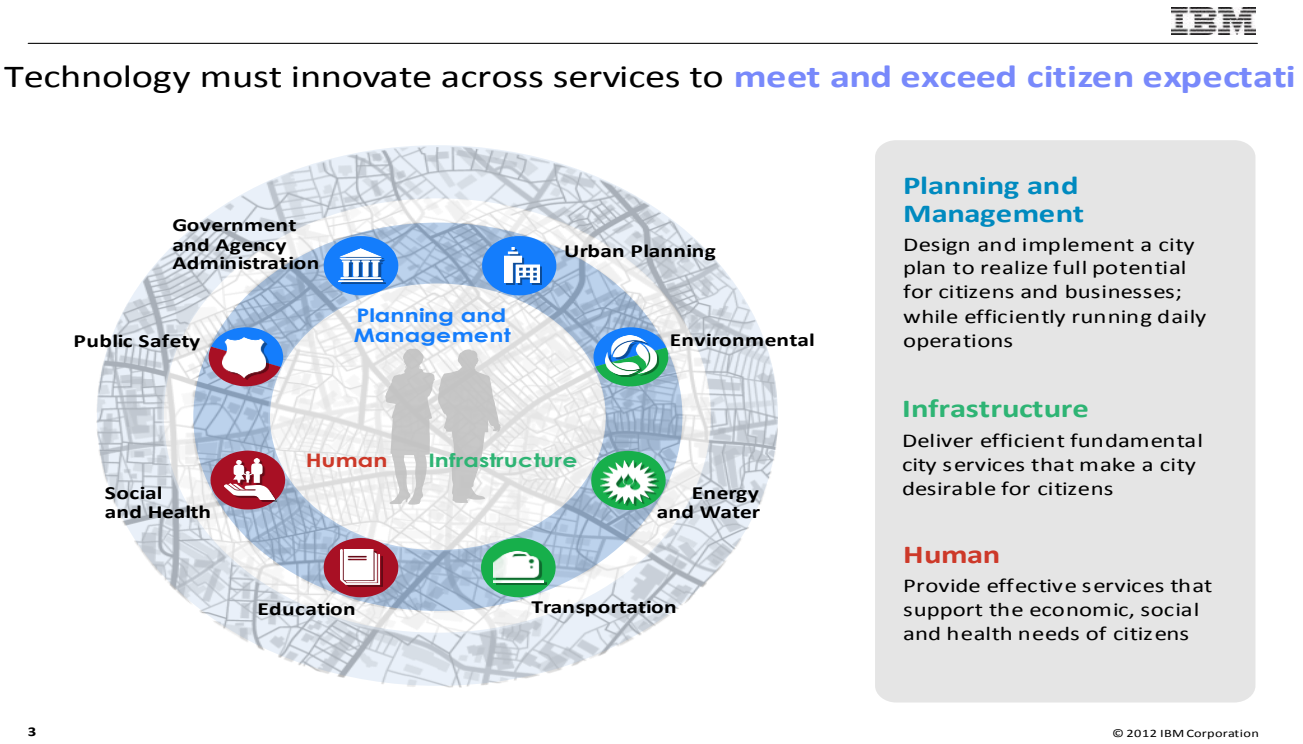


Figure 2.5 IBM Smart Cities Technology Model (IBM, 2012)

Figure 2.5 provides a view of the IBM Smart Cities technology solution. The solution can be started in one area, such as urban planning, and can be extended when resources, schedules, and plans include transportation, or energy and water, or any other area or smart city objective prioritized by the city leaders.

Complementary to this model are the four key concepts of the IBM Smart Cities technology service delivery model, which includes the need for:

- Integrated outcomes-based policy: Looking at desired outcomes, how the current government offerings achieve this, and the opportunities to reduce overlap and duplication, and addressing the gaps in the service offerings available.

- "No Wrong Door" service delivery: Looking at the design, availability, and alignment of service delivery channels and optimizing the service delivery in each of them. No Wrong Door makes sure that wherever the citizen goes, they can access all the services that they need.

- Intelligent processing: Understanding how to take account of priority, complexity, and risk so that processing applications for services and benefits are automated wherever possible and people are asked to do only the things that are truly required.

- Collaborative governments: Understanding the overlap between departments, governments, and non-governmental organizations and leveraging their collaborative nature to achieve the outcomes that government desires and citizens need. (Duggan, 2013)

Usually, multiple concerns are raised and the problems are so large that they are insurmountable at once because multiple areas are identified to be “fixed” but time and budget are limited. Prioritization becomes integral to the process of change management and technology adoption, and the third aspect of smart cities engagements becomes the criticality of stakeholder commitments. Citizens as stakeholders are integral to assessing, prioritizing, and leading the change.

Power Dynamic in Urban Policy and Planning

Researchers have spent a good deal of energy following urban planning and understanding the distinct differences and the related terminology applied to specific concepts and urban implementation models to describe the process of urban change (Hersperger et al, 2014; Wlodarczak, 2012; Hastings, 1996).

The perspective that smart cities contributes to achieving objectives toward sustainable living for growing populations (IBM, 2012; Cisco; 2014; UNDESA, 2015; WHO, 2015), is countered by others who view the movement as a play of dynamics for control and power of urban policy (Foucault, 2008; Foucault, 2007) with the risk of putting control into the hands of few who own and operate urban software systems. Foucault (2007) embarked on security research to develop 'a conceptual framework for the study of differing apparatuses of power or governmentalities’ (Klauser et al, 2014) in smart cities. Foucault’s (2007) scope extended beyond the earlier work of others (Beatley 1995; Baudrillard, 1994) who approached discourse of security as power acts (Minton, 2014), and discipline techniques applied by discursive regimes.

Kaluser et al (2014) summarize the dynamic of security and algorithmic governmentality (Budd and Adey, 2009) as risk to the citizens of the city. Software data analytics and the automation of analytics into standards and process is not neutral but a power dynamic for those who create the systems, the rules and those who have access to the data outcomes. "Governing through code induces a temporal dynamics of regulation in which the relationship between past, present, and future manifests itself in a specific way: governing relies on predefined codes, derived from the analysis of the past and applied to the present, to anticipate the future" (Klauser and Albrechtslund, 2014).

The process of normalization of systems belongs to stakeholders of the system. They are the controlling governing authority. Stakeholders set the conditions of the system and governance based on automated data analysis, and decides the "disciplined context" (Klauser et al, 2014).

In smart city environments the spatiality factor is characterized as geo-governmentality (Foucault, 2007, Klauser et al, 2014). Furthermore, Foucault (2007) claims that stakeholder companies working in partnerships reign with control, gain more power and influence regulatory logic. These partnering stakeholders create supportive power factors for each other (2007, p. 107).

Objective setting and goal achievement are both subjective and outcomes vary depending on the elements and persons who influence governance model and control measures, stakeholder engagement systems design and decision-making and funding (Bayulken and Huisingh, 2014; van Hal, 2000).

Klausen et al (2014) identified four smart city focus areas related to the implications of governance through technology (code) that would benefit from academic research and discourse. They are:

- Governance through code and the everyday - governing through software programs and analytics for any purpose, efficiency, convenience or security is not neutral
- Governance through code and economics - power dynamics, economic imbalance, liberalist governmentality are part of the governing via technology
- Governance through code and urban policy mobility - power dynamic related to technology companies who position their solutions as a model of urban policy and influencing regulatory logic

- Governance through code and security - In reference to Foucault's security (2007) data analysis and orchestrated surveillance places technology as power over population (Klausen et al, 2014).

In 2014, during my research cycles, Soderstrom et al delivered a narrative positioning IBM's Smart City solutions as rhetoric, "utopian storytelling" (Soderstrom et al, 2014, p.315).The authors align IBM's contemporary initiative with Thomas More's Utopia (Hexter, 1965) and quote a 1997 article by planning historian Francoise Choay, who argued that Utopian urban planning is always conceived as “therapeutic discourse starting off with a diagnosis of urban problems and pursuing with a set of universally valid solutions” (Choay, 1997, p.262; Soderstrom et al, 2014).

Despite contrary viewpoints, many city officials know that they need new technology to solve a multitude of problems, but they do not know how to define technology requirements in relation to policy and planning. Many need a logical change process to follow or even budgets to pay for the innovation and change that they want to implement, so they look to partner with private sector and investment ventures that want to get their technology or solution into a city plan. A constant concern is to ensure that there is consistency in stakeholder commitment; this requires participatory action from both the public and private sectors, and a constant monitoring of any un-checked power dynamic (Klausen et al, 2014).

IBM’s Approach to Power Dynamics in Urban Policy and Planning

A key aspect of IBM Smart Cities (IBM, 2010) is the technology as it fits into the jurisdiction where it will be applied. Every country has its own political and administrative design, and although there are some similarities, it is important to understand the differences and to know how to operate in each particular environment, gain knowledge of the local policies and regional cultural norms, roles and responsibilities, financing and funding mechanisms, and relationships between jurisdictions (tiers of government).

There are three recognized tiers of government to work with for smart cities to sell solutions that are relevant to the jurisdiction:

- National and federal governments
- State and provincial governments
- Local governments (mega cities)

The best prospects for smart city technology and innovation are organizations that:

- Work closely with citizens, often around a detailed *service plan*
- Talk about both outcomes and inputs and outputs
- Need staff to work collaboratively internally as well externally with other organizations
- Are often scrutinized in the public domain by government and citizens on the success of their programs and service

Chapter 3. Methodology

The objective of this research design section is to describe my action research approach, techniques adopted as part of my methodology and to provide details of my research cycles. Planning my research out over a longer period of time allowed for a multi-phased approach (Yang, Huang and Hsu, 2014; Zuber-Skerritt and Perry, 2002) and allowed for iterative adjustments of research cycles. I was able to build in reflection time between each of the cycles of research activities that allowed for adjustments as I started to make connections and see more clearly the progression and direction that my research was taking me.

The scope of my research combined international expertise and perspective with direct experience from an American leadership and corporate view impacting change on an IBM project (see Case Study 1). Further research included studying an urban village approach to smart cities in North America (see Case Study 2) and the ecovillage approach (See Case Study 3) to smart cities that originated in Europe, and spread to Asia. I gained experience working and conducting action research on smart cities cases with Asian engagement teams from both internal and external viewpoints and brought the findings back into an applied setting on the IBM project. I traveled extensively over two years to many countries to conduct my research. I worked in urban and rural settings to participate actively across all aspects of research for these case projects. I conducted interviews and observed the participants of my research in person in their “cities” settings. I believe it made a great difference to build trust, openness and sharing by conducting the interviews in person as much as possible.

Using Action Research as a Transformative Approach

Action research links research, action, theory, and local knowledge to transform existing conditions (Greenwood and Levin, 2007). Action research and the contribution of qualitative, interpretive work (Willis, 2007) in natural environments and social situations helps make connections and assign relationships that give meaning to the observations and information gathered in the research setting. Grogan, Donaldson and Simmons (2007) describe the importance of action research as a transformative strategy as “the tension between theory and practice can be put to generative use in the production of knowledge that is valid, usable, and transformative in a local, context-bound setting” (Grogan et al., p. 6).

The researcher using qualitative research in an action research setting can be guided by Tracy’s (2010) eight best practices to ensure quality including a worthy topic, rich rigor,

sincerity, credibility, resonance, significant contribution, ethics, and meaningful coherence. There is also room to incorporate qualitative review (Norton, 2009) through dialogue, imagination, growth, and improvisation (Tracy, p. 837) as the process of data gathering, interpretation, and resolving issues (Stringer, 2007).

Dedication to any research project reveals something about the researcher (Creswell, 2005), who has prioritized pursuing inquiry, and the importance of the relationship of the chosen topic to the researcher. Equally revealing is the researcher's ontological and epistemological status in acting to understand more and gain new knowledge about the topic. A researcher can draw on knowledge that already exists, new data gathered during the study (Stringer, 2007), and analysis and interpretation generated in reflection (McNiff, 2013; Schön, 1983), and still there is likely to be more exploration through dialogue with supervisors and inquiry and review with colleagues.

My particular approach to defining my study proposal was to be conscious of my existing knowledge and related bias while respecting my curiosity and interest to further the investigation of the topic for its potential to contribute to bringing change in the world. I was aware of the multi-faceted opportunity and the potential enormity of the scope related to smart cities research. I was also aware of my time and resource limitations for this project. Offering case studies as a lens to impact positive change during the 'Taking Action' (Stringer, 2007) cycle added a valuable contribution to my scholarly practice in action research. Smart cities research has social context (Hoppes, 2014) and is an ideal area for a stronger critique in voicing the intersecting contextual vectors of power, knowledge, and culture (Denzin, 2009). External cases findings offer collective intelligence and new perspectives to bring back into the project.

The implications of the choice of action research, qualitative in nature (Savin-Baden and Howell-Major, 2010), emphasized that concrete considerations were needed in each cycle of my work. I balanced both theory and practice in my preparation and approach. I formalized my claims based on data analysis, empirical evidence, and situational practice.

In reviewing a choice for action research, a list of implications tends to focus on the reasons to defend a choice action research because it is non-traditional research. Though it is often de-legitimatized (Herr and Anderson, 2005, p. 52) by the academic community, action research is critical to gaining insights and capturing tacit knowledge for smart cities through conducting

field research (Wolcott, 1995) to improve practice (Buchanan, 1980; Craig, 2009; Reason and Bradbury, 2008).

Action-based research requires a comprehensive approach, including both rigor and relevance to support the depth of the scientific and the breadth of the practice of action research. The scholar practitioner quickly realizes that these are strengthened by the presence of and dependence on each other. They regulate themselves to maintain equilibrium. I did not have any one specific study to reference for the same combination of the methods chosen for this research so this presented another occurrence to bring together scholarly knowledge and practitioner experience. I used reference books on how to conduct action research (Creswell, 2005; Herr and Anderson, 2005; Lingard, 2008; Savin-Baden and Howell-Major, 2010; Tracy, 2010; Wolcott, 1995) with case study models (Stake, 2000). At times, during the research process, I needed to modify behaviors for the duality of my scholar practitioner role (Pettigrew, 2001). I needed to switch behaviors to facilitate and innovate versus administrate, trust a situation versus control an outcome, nurture versus organize action and change.

Research Methods

My work was based in action research design and I used blended methods (Venkatesh, Brown and Bala, 2013; Onwuegbuzie and Teddlie, 2003), quantitative and qualitative approaches, (Cronin, 2014) in multiple stages and research iterations. The nature of the work and environs was complex and blended method design generated strong inquiry, incorporated the existing body of knowledge, and allowed for inclusion of rich insights to be captured related to the phenomenon being studied on smart cities (Caruth, 2013).

I participated with intention for all parties in each environment to grapple with the problems, grasp the complexity of the issues, and follow the lifecycles of the projects being studied. I was continuously circling back in reflection (Van de Ven and Poole, 2005) at each cycle of action research to connect, comprehend and make sense of the issues to achieve valid research findings to generate useful outcomes and apply change on the IBM project.

My Approach and Plan

I used a Lewin's (1947) model to build my research plan and coordinated phases of ongoing action research that would be adaptive for both internal, inside IBM, and external, on outside case studies, research cycles (Louis and Bartunek, 1992). My research was cyclical in nature, adapted to incorporate Coghlan and Brannick (2010, p. 10) and Cardno and Piggot-Irvine's (1996, p. 19) action research conceptual framework influencing people, processes, and systems (Pedler, 2008) as introduced earlier in Figure 2.3. Phases were planned and built on Lewin's (1947) model and steps of Constructing, Planning Action, Taking Action, Evaluating Action, with ongoing reflection and adaptation for the next phase of research, as shown in Figure 3.1.

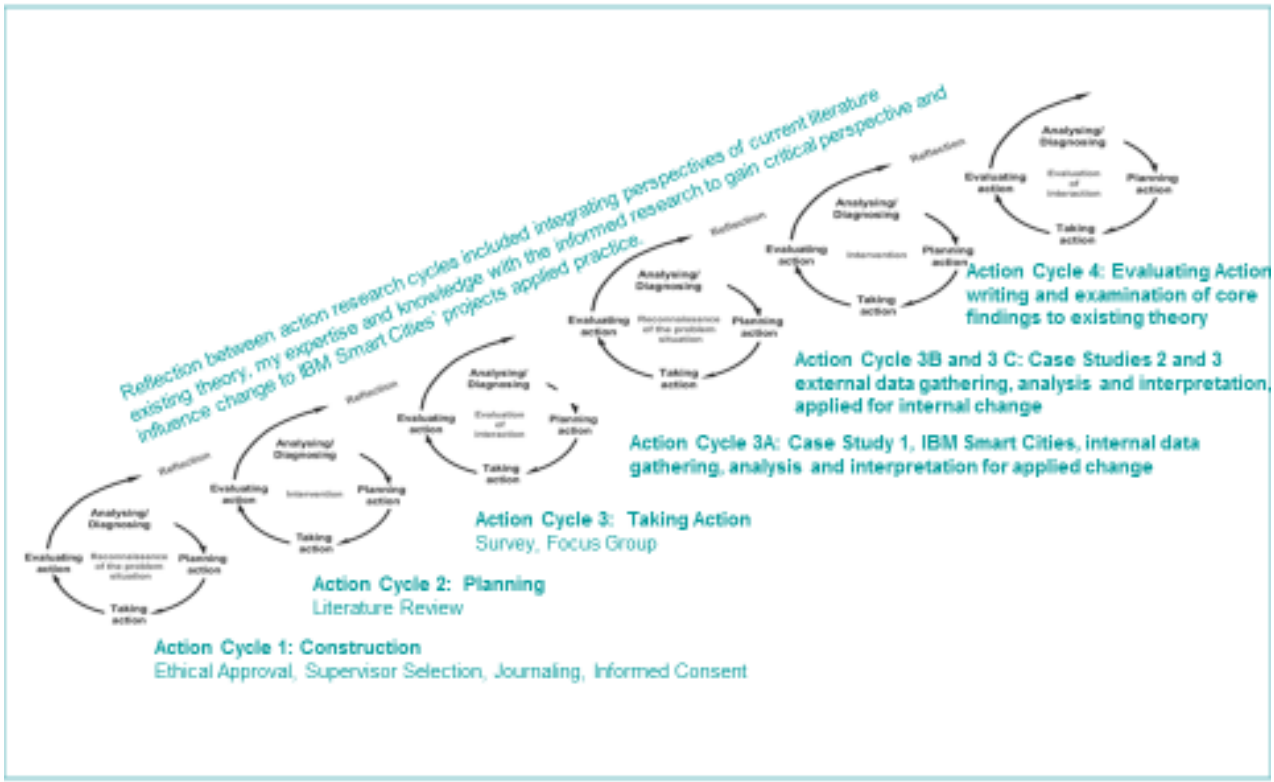


Figure 3.1. Overview of my Action Cycles: Construction, Planning, Taking Action, Evaluating Action

Data collection based on my key questions for this research (see Chapter 1, Key Questions for My Action Research) study took place from June, 2013 to December, 2014. The process involved regular review of plans, actions, and evaluation of data content and outcomes by research participants, academic peers, and my research supervisor. The action research process promoted change management through applied learning (Argyris, 1993; Cho and Egan, 2009) in IBM so my methodologies needed to support this goal as participant on my IBM team and as outside-observer on the other cases, when applicable, for the duration of my research. Each cycle of my action research, both internal and external phases, influenced change based on key findings brought back into the IBM project.

It was my responsibility as researcher to create a realistic plan and to ensure that I also upheld the integrity of the project schedule. My leadership skills and my doctoral-practitioner training prepared me to act accordingly for the most good for all my stakeholders, encouraging ongoing participatory inquiry (Ergold and Thomas, 2012; Reason and Bradbury, 2008) and review phases with the research participants. See Figure 3.2 and Figure 3.3 for a detailed view of my action research approach and timeline table. My research process required a great deal of disciplined reflexivity (Cunliffe, 2010) in times of clarity and more so during times of contradiction, and paradox, (Vince and Broussine, 1996; Craig and Snook, 2014) and ethical concerns.

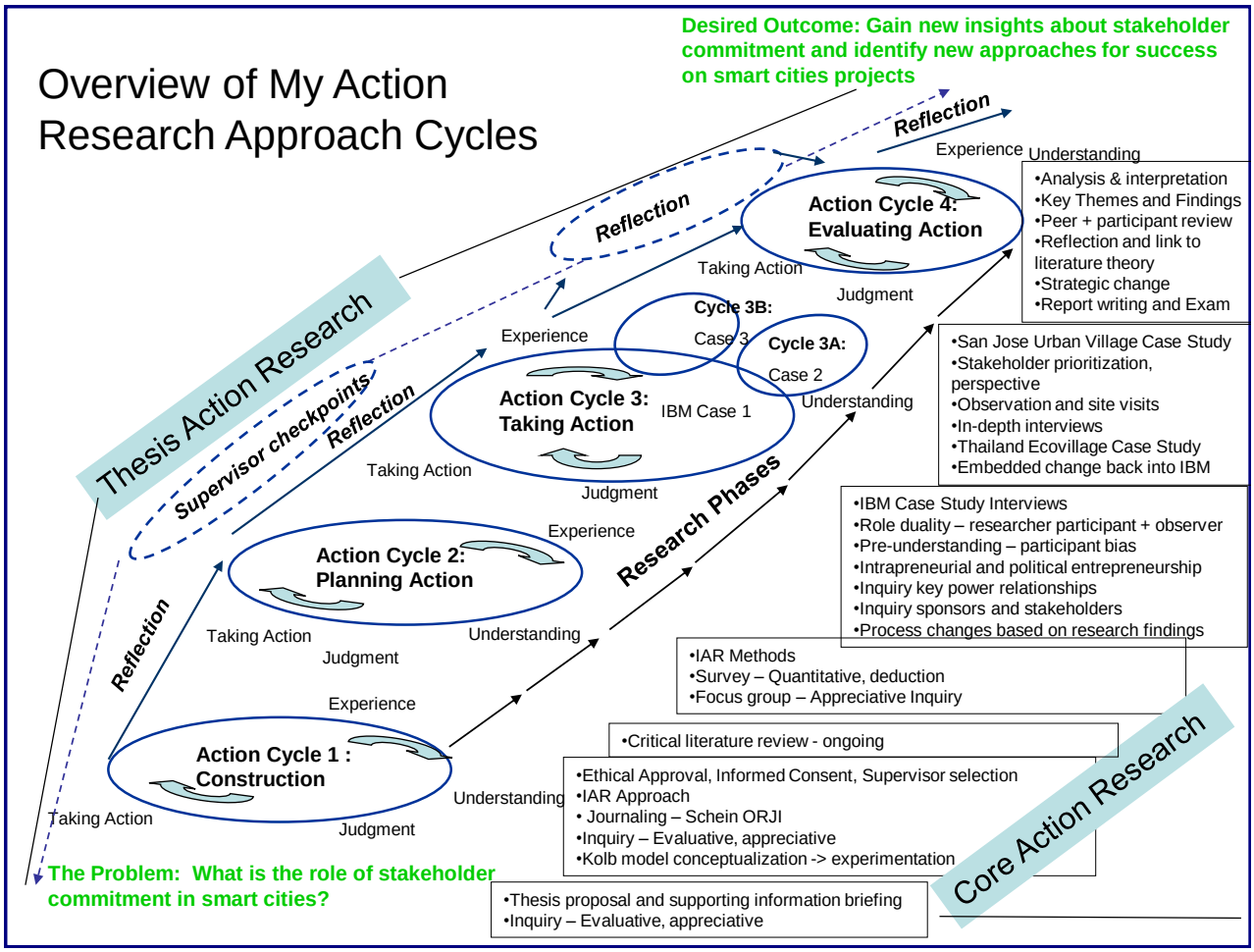


Figure 3.2. Detailed view of my thesis and core action research cycles

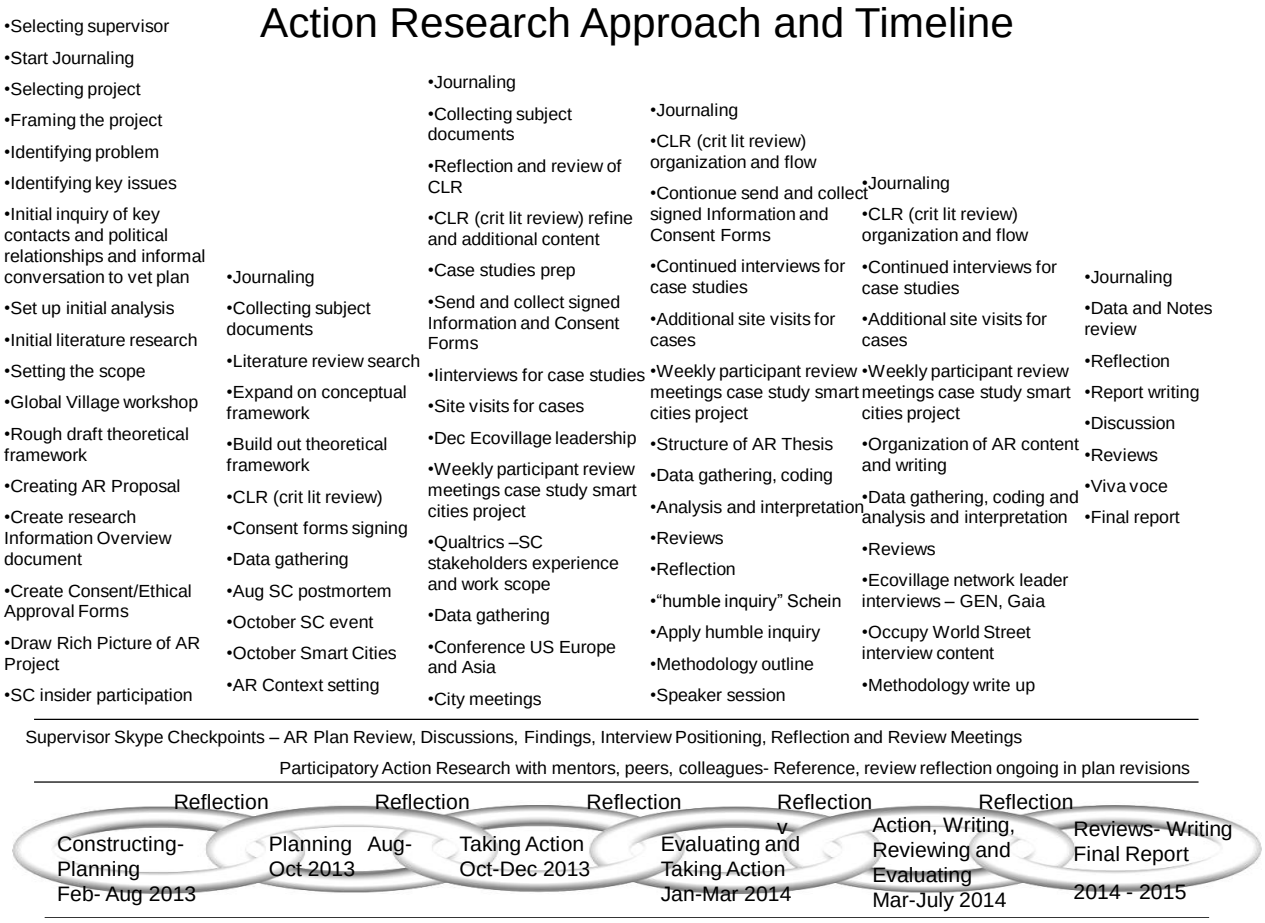


Figure 3.3 Table of action research task approach and timeline

Action Cycle One: Construction

In Action Research Cycle One, Construction, my main focus included framing my research in an action research proposal, selecting my supervisor, creating consent and Ethical Approval forms, creating my action research Information Overview Document, establishing my journaling practice related to this research and engaging with the literature.

Ethical Approval

IBM is a company built on the principles of stakeholder management. The IBM mission, vision, and values have been similar in focus since the company was founded in 1911. In 2003, IBM held a "Values Jam" to redefine and update the values that guide the development and delivery of its technology and business products and services.

As a company, IBM carefully aligned the company business model to support all stakeholders, including shareholders who are a category of stakeholder (Sundaram and Inkpen, 2004), as they are critical to IBM success. The IBM model is a variation of the equation, “concern for profits is the result rather than the driver in the process of value creation” (Parmar and Freeman, 2010, p. 364).

I would be bold enough to say we take action as if it is a means to an end rather than an end to a means. As an IBM employee and insider research participant, I abide by the IBM Business Conduct Guidelines (BCG) that specify IBM's standards of business ethics, basic values and principles. They provide general guidance for IBM Employees, our subsidiaries and affiliates. Santana (2012) might categorize these as our legitimate stakeholders who are linked via societal perceptions and/or relationship claims (Santana, 2012, p 257). This seems very clear and straightforward as a set of rules but interpreting them in the job can become complex.

Guided by a set of joint business objectives, and recognizing the value and diversity of stakeholder partners, our case team agreed to abide by the clearly defined set rules of engagement for working together on this joint project. The extended team are all stakeholders who have a legitimate “stake” in the game (Goodpaster, 1991, p.54). These companies and other vendors were part of the joint business solution, and we needed a concurrence meeting to ensure we could all abide by the IBM BCG. Many employees shared their company guidelines, as well. Upon review, the team decided IBM’s BCG was all encompassing and all members on the project team, IBM and others, agreed to follow the same guidelines to ensure stakeholder management policies function across the stakeholder alliance environment (Zhang et al, 2012).

The fact is that power and control from one interested individual or group can quickly overrule stakeholder considerations and influence these outcomes. Mitchell et al’s. (1997) research states that ‘‘legitimacy and power are distinct attributes” and when combined they create authority. This is legitimate stakeholder value (Santana, 2012). Leaders are supposed to enforce the policy and support business partners but they may represent a greater self-interest (Cennamo et al, 2009). When the team found ourselves looking at stakeholder analysis from very different perspectives (Goodpaster, 1991,) we were faced with conflicts to resolve quickly before the project broke down. In my research setting, when I saw we were potentially entering conflicting areas of values, when one member or sub-team took one tactical approach and another team expected something different then stakeholder conflict arose and the defined

rules were not enough to determine the next action (Goodpaster, 1991). When I saw any instance of individual values overruling the group's shared values or professional or personal permissions were at stake across stakeholder groups (Cennamo et al, 2009) we paused for a core team process checkpoint to revisit our positions and agree on how to proceed together.

One instance of this is shared in more detail in Case Study 1 when the team ran into a conflict regarding the broad authorization and accessibility and planned use of healthcare data for the project. Another instance is shared on Case Study 3 when I was faced with the upholding the confidentiality of site operational details shared with me by the ecovillage team when asked to share confidential information by the ecovillage governance members.

My individual core values influenced my effort to stay on an ethical path. When I recognized what might constitute a power play, bias or ethical issue (Bell and Bryman, 2007, p. 71), it was important for me to check my own behavior (Bell and Bryman, p. 66) as well as paying attention to the group situation unfolding. It required extra time for self-reflective inquiry (Greenwood and Levin, 2007, p. 216) in order to influence the group in the agreed upon direction. The intent of my research was to gain outsider perspective on the role of stakeholder commitment in other smart cities environs and to incorporate what was learned into our projects. The intent was to open our lens beyond "IBM only" and counter-balance any existing IBM bias from working with 'insider' blinders on earlier projects where the team did not seek outside perspectives. Another opportunity was to observe and incorporate alternative smart cities' insights into the IBM project as a mode of improving our practice from the experience shared by others outside the firm who had a different perspective of the role of stakeholder commitment. Action research outcomes supported behavioral change on our project for the benefit of all stakeholders. Findings were introduced and change applied supported increasing openness and inclusion (Verhezen, 2010) of new practices from external research into IBM Smart Cities' projects.

As an ethical procedure and to ensure my research participants were fully-informed and had time to review the objectives of my research before offering consent to participate, I provided my Research Information Sheet and Participant Consent Forms (Appendix A) to each participant. The forms were distributed either via e-mail prior to our meeting or in hard copy form to be read and signed. Informed Consent was obtained by all participants prior to the commencement of research.

My responsibility to protect and inform my research participants was clear and communication consistently upheld during the entire process. Interviewees approved recordings or consented to notes, artifacts gathered, pictures, and were reminded that they could stop an interview at any time if they desired.

It was not my intent to harm or hurt anyone in the process of conducting my research and I do not have any plan to expose flaws in current projects or case studies as I look forward to any publication of my findings. My concerns as a committed researcher were to protect the identities and disguise specific organizations using aliases as needed. I set an expectation and a set of assumptions at the outset of my work in my Ethical Approval, and I acted within those boundaries to respect the confidentiality and ethical code established and agreed upon (Bell and Bryman, 2007, p. 69).

Informed Consent

After receiving Ethical Approval by the UL review committee I began my formal action research cycles. My Research Information Sheet and Participant Consent Forms (Appendix A) were distributed either via e-mail prior to our meeting or in hard copy form to be read and signed and returned in person by each prospective participant. Informed Consent was obtained by all participants prior to the commencement of research.

My responsibility to protect and inform my research participants was clear and consistently upheld during the entire process. I reassured my participants that I would uphold the highest standards of ethical behavior in this study and make every effort to clarify biases and contain them and keep other experiences and orientations segregated from my research (Creswell, 2013), ensuring that they were represented fairly and honestly while upholding their request for anonymity.

To my internal peers and participants, I offered transparency as insider-researcher regarding the team project case. The external participants were reassured that they would be accurately represented in the documented case studies and that they would have the opportunity to review and provide feedback, as a phase of validation, following their interviews and during the related analysis and interpretation of the findings. Creswell (2013, p. 213) recommends a standard of reciprocity between researcher and participants that includes intense sharing, trust, and mutuality, particularly in research of an interpretative and qualitative nature.

As an experienced practitioner and new management researcher, I relied on my professor-mentor affiliations to review my research plans at all stages from concept through publication. In return, I offered them access to my management experience and professional environments, networks that may be of interest to them in their research endeavors. As Bell and Bryman (2007) suggest, this joint research and consultancy approach can be a positive congruence of the practitioner and researcher community (Bell and Bryman, p. 67). Pragmatic peer review standards were established early and were reviewed repeatedly to maintain reputable validation and a balance of rigor and relevance in every contribution to management research across all diverse stakeholder sources (Herr and Anderson, 2005).

Journaling

I started journaling at the beginning of the thesis cycle to jot notes, doodle, make connections in the information, gather new ideas and pieces of information, and to incorporate reflexivity, (Coghlan and Brannick, 2010; Cunliffe, 2010), which means examining and exploring personal introspection (Moustakas, 1994) and explicit self-aware meta-analysis (Finlay, 2002) into my process. Journaling began in this cycle and continued for the duration of my research. I used Schein's (1999) ORJI model (Observation, Reaction, Judgment, Intervention) to note what was influencing my researcher experience and to note how the related thinking affected my research actions (Schein, 1999, p. 28).

Journaling helped me capture what I was experiencing and my interpretation in the moment and then to answer why. I was able to reflect and return to it later and think deeper to make connections, to note when I may need to address issues, and to note any potential bias on my part or observed by a participant's actions. I noted often that I had too many ideas, the scope seemed to expand beyond my plans quite often, and journaling helped me to return to the scope of my research. The journal was a single repository for all of the 'noise' I heard or learned related to my area of research. (See Appendix B.)

A key observation was that often I would be making a personal note about my own response to a situation in a journal and the team or individuals in the room would ask, out of curiosity, what I was writing in my notebook. In response, I explained the process of journaling, how it helped me to track both my core and thesis research, but most importantly how it helped me to see the viewing lens of my research based on my 'own window' to the world. I was almost always willing to read the current entry to them, although there was one specific instance when I purposely chose not to share when asked by a colleague. I didn't know quite why at the time,

except that it would feel wrong. I later worked through it in detail and used it as an early phase learning experience that I would revisit often over the next year.

Kolb's cycle (1984) helped me to process an experience, reflect, relate, and conceptualize and then decide on actions based on the reflection. I had more self-awareness as outsider-researcher for a similar situation following this experience. The situation of not sharing my journal entry above related to my researcher role. I was invited, as an outside observer, to a team meeting regarding an expensive project that was not progressing well and had far exceeded budget without being near completion. The details as I listened bothered me as much as the team in conflict about how to move to the next step.

During the meeting, as the most senior employee and the most experienced person in the room, a few people turned to me with an expectation that I would speak up. But I refrained. I wanted to step in and start to solve the problem but I was only in the room because of my research. I was an 'outsider-observer' and it would have overstepped the boundaries of my participation in the meeting to even participate using a facilitator type of inquisitive inquiry. I knew that if I participated there would be people in the room who felt it was not correct because I was not part of their core team. I chose not to share this entry at the time because it could be interpreted as interference instead of assistance and someone may have felt uncomfortable or exposed, even harmed by later actions due to the nature of the meeting issues.

This was an early lesson in my research, but a big one, and going forward I recalled it often when I needed a reminder to "stick to the role" I was fulfilling as an actor in my research process (Louis and Bartunek, 1992). Upon reflection, this experience became a rationale for my methodologies, to recognize potential introduction of bias and to ensure rigor in the process of data analysis. This event represented a significant experience in my evolution from project leader to scholar practitioner in the midst of the research process. Coghlan and Brannick (2010, p. 37) share Lonergan's (1992) findings around the premise of practical knowing. Practical knowing is spontaneous while scientific knowing is methodical–or practical knowing as common sense knowing but the process of validating this knowing as a part of a formal action research process is critical to validate findings while ensuring both rigor and relevance is applied.

While science will have us remove the human element out of scientific research and thereby consider it more credible and rigorous, I contend that insights derived from journaling over a

period of time offer valuable contribution to research findings, and the human element of interpretation is necessary to deem these findings a credible part of the action research process. Humans are the subject of management science and therefore a necessary element to observing and recording how we deal with the world (Coghlan and Brannick, 2010, p. 36). Experiential, presentational, propositional, and practical knowing relate to human action. Whether scientific or action research, the population of participants in management research relates to human behaviors, the hypotheses are tested on humans, in human environments, and results are analyzed, interpreted, and reported by humans to have the outcomes applied by humans, as observed in my IBM Smart Cities' environment.

Action Research Cycle Two: Planning

In Action Research Cycle Two, Planning, my key focus was identifying existing knowledge related to my research topic by conducting an in-detail critical literature review, see Chapter 2, reframing the scope of my research based on my literature mapping, planning my action research approach, methodologies and data gathering.

Critical Literature Review

Levy and Ellis (2006) wrote that a systems approach to effective literature review should have a solid methodology for selecting, analyzing and synthesizing the findings and the proposed research must "demonstrate and contribute something new to the overall body of knowledge or advances the research field's knowledge-base" (2006, p.182). The critical literature review, presented in Chapter 2, identified current scholarly and practitioner knowledge related to my topic. It also helped me to formulate and reframe my problem and related action research plan.

During all cycles of my action research (Argyris, Putnam and Smith, 1985), I continued to incorporate perspectives of current literature with my practitioner expertise and knowledge of current technology and innovation solutions for IBM Smart Cities.

Continuous literature review of qualitative methods in action research, smart cities, urban planning, and ecovillages, smart technology, sustainability, stakeholder management and commitment, intertwined with reflexivity and critical thinking gave new perspectives on how I might gather more data or analyze the qualitative data for insights. It also helped to define and map relationships and avoid fragmentation of all the data when I moved into the phase of interpretation and reporting findings (Pedler, 2008) of my research.

I continued to review and refine the current information as both practical applied information and academic research of smart cities and related topics increased in the past few years. Reviewing business architectures, frameworks and models and reading related articles helped me to understand the new approaches, key focus areas and gain experience about the commitment required from stakeholders in the field. It helped me relate to the work that I was doing at different phases of my project as I could “see” another researcher’s process or methods in an article or understand a technology company approach, an interest group’s model and to learn what could be applied from actual implementations underway.

The critical literature review offered existing knowledge and perspectives used to build questions for the interview phase. A review of the key findings of my action research and links to the existing research of my critical literature review can be viewed in Chapter 5, Figure 5.1.

Reframing My Plan

During this planning phase I reviewed findings and shared critical literature information, see Figure 2.1, with my peers and leadership at work. Together, we discussed that the research and many articles related to smart cities in current literature covered behaviorist practice or explicit knowledge on how to implement sensors, use technical devices and machinery specific in industry settings. IBM was also very good at defining the technical specifications of technological equipment and how to apply the tools for specific industry solutions. IBM also had some existing resources tracking regulatory issues and new policy changes and requirements. However, we concluded that a gap exists related to stakeholder commitment, change and understanding economic, environmental and other factors on projects. My research could offer value in understanding stakeholder commitment and capturing tacit knowledge on case projects.

At this time, I reframed my action research and scoped a plan to take a constructivist (Schwandt, 1994; Richardson, 1997; Crotty, 1998) research approach to study stakeholder commitment on smart cities projects. Constructivism in social science and qualitative research offers "the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context" (Crotty, 1998).

The next step, however, would be to take action in a research setting where I could gather more knowledge to inform and further define the scope of my future qualitative research phase.

Action Research Cycle Three: Taking Action

Action Research Cycle Three, Taking Action, included using a blended approach, including both quantitative and qualitative methods, to conduct my action research. The phases in this cycle are summarized in the table below and described in more detail in the following sections.

Method	Description	Overview	Outcome
Quantitative	Survey, web-based	277 invited to respond to survey, 128 partial responses, 43 complete responses. International participants, leaders and smart cities experts in multiple functional roles	Informed next phase of research. Identified case study approach and move to set up focus group to inform next phase action research
Qualitative	Focus Group	In-person, August 2013, in North America. 2 hours with an international group of 24 smart cities experienced participants. 4 tables of 6 participants. 4 areas of focus appreciative inquiry process	Identified scale of smart cities projects, types of projects in the definition of smart cities, key stakeholder roles and key individuals to interview in case study settings. Drafted case study plan and made potential case choices.
Qualitative	Case Study 1	IBM in-person interviews, site observation, meeting participation, data gathering of materials, project artifacts and documents, photos. For more information see Chapter 4, Case Study and Appendix F	Change to project plan and process in real-time on project and process for securing stakeholder commitment for future IBM Smart Cities' projects.

Qualitative	Case Study 2	In-person interviews, site observation, meeting participation, data gathering of materials, project artifacts and documents, photos. For more information see Chapter 4, Case Study and Appendix G	Findings informed stakeholder commitment actions and identified change that was embedded back into IBM project.
Qualitative	Case Study 3	In-person interviews, site observation, meeting participation, data gathering of materials, project artifacts and documents, photos. For more information see Chapter 4, Case Study and Appendix H	Findings informed stakeholder commitment actions and identified change that was embedded into IBM project and shared with some Case Study 2 participants.

Survey, Methodology and Analysis

This quantitative phase of my research cycle of Taking Action served primarily to garner deductive insight (Hyde, 2000), decisions made based on an increased understanding of the problem, that could be used to further define the scope of my qualitative action research cycle (Neale et al, 2014; Ritchie et al, 2013). It also provided access to get confirmation from key participants who agreed to be interviewed in a future phase of the research process.

I designed the questionnaire using the Qualtrics online software instrument, informed my design taking into consideration the benefits and potential issues of web-based surveys, and utilized varied question formats built from best practices for web design surveys (Couper, 2008).

My research survey required input from an international sample, nonprobability population sample (Teddlie and Yu, 2007; Patton, 2002) from whom I could receive responses in a short timeframe. Though one potential issue with a web-based survey (Wright, 2005) is the lack of access by individuals who are not technologically savvy or connected via network access, my stratified sampling (Strauss and Corbin, 1990; Golafshani, 2003; Patton, 2002) was a

demographic that was working in technology-based environs. I addressed concerns of privacy and ensured anonymity in the data collection process.

I conducted a web-based quantitative survey (Fowler, 2013) for this project to assess stakeholder roles for smart cities and determine more specific focus of the research project. Invitations were distributed online to obtain responses. I used a stratified random sampling, within target groups of technologists, smart cities interest groups, sustainability groups and city employees. The goal was to capture key characteristics from these populations in the sample to represent proportional characteristics to the overall population.

The survey invited participants (Easterby-Smith, Thorpe and Jackson, 2012) to contribute to research by sharing their existing knowledge and identifying areas where interested parties offered they needed to know more to support success on their smart cities' projects. The goal of my survey was to challenge assumptions and gain more clarity about my future research phase plans. I also wanted to identify more specific topics within the broad concept of smart cities to construct future appreciative inquiry (Cooperrider and Whitney, 2005; Drew and Wallis, 2014) in a focus group setting to reveal the next level of knowledge.

The Qualtrics instrument provided anonymity for participants, the template for creating the survey was provided and customizable for my survey needs. The ability to compile results and export them for further analysis using quantitative methods was defined and applied. I used SPSS, an IBM tool, to import Qualtrics survey results and manage my data analysis.

Appendix C shows results of the survey, and includes responses to questions about years of experience on smart cities projects, relationships to projects, how respondents were working, sources for getting information to apply to their projects, and more. Participant socio-economic characteristics were not defined.

Quantitative results, that led to deductive insight, (Hyde, 2000) from the survey analysis provided direction for the next phases of qualitative research. The survey provided important outcomes to understand more about the stakeholder role in smart cities and more about the individuals who were identified for these roles and how they were building expertise to manage and lead these projects.

This phase helped me as practitioner to formally define and retain control of the research boundaries. The topic could have otherwise been too "open a plan" and spread across too many areas of focus to gain meaningful insight and knowledge. The value of the positivist quantitative approach for this initial survey phase was to take an objective realist and

deductive direction, which served in defining the boundaries of the specific questions and attain responses represented as quantitative numerical values. The resulting outcomes quantified input from the population sampled and was used to verify the scope and focus of what to do next. The quantitative research undertaken in this important initial phase with the key goal of providing an informed approach to qualitative research cycles that would formulate the main body of my research as Smart Cities is a vast topic and rich setting for action research.

277 individuals who have a stakeholder role on projects were invited to participate in the survey. 128 responses were returned that represented the public and private sectors, large, medium, and small organizations, and their subject matter expertise was represented across multiple industries, energy, transportation, and water. When scrubbed for full disclosure of content for total assessment, 43 responses were complete for all information. The survey input was aggregated to derive survey results and were used to define the main phase of my research, the qualitative phase. (See Appendix C for Survey Questions and more details from the survey analysis.)

SPSS correlation and regression analysis of the survey data (Pall ant, 2007) showed the most useful information to support smart cities implementations (Kukka et al., 2013) would be to identify best practices, case studies, policies, and regulations as topics for key research. A direct correlation showed that seasoned professionals placed particular importance on sources of funding and sustainability as well. Based on this insight, and the access I had to global engagements and subject matter experts that may be open to participating in my action research, I took a case study approach for my future action research (Pedler, 2008; Stringer 2007) cycles.

Survey findings offered evidence that technology solutions and innovation might offer the highest probability of ensuring the success of a smart cities project. More details were garnered in later interviews to corroborate this response and provide qualitative information to gain deeper insight. The stakeholders (Friedman and Miles, 2002; Mishra and Mishra, 2013) surveyed held different functional roles in their organizations and vary in years of experience. My survey population had a high number of experienced professionals and though this is their area of professional focus, most of them have fewer than five years on smart cities projects, likely due to the newness of many forms of these projects.

One of the critical insights on every project is to know who the key stakeholder (Friedman and Miles, 2006) is to ensure that the project will be successful. Due to diversity of the multi-stakeholder scenarios in a smart cities project, it is not always easy to determine who that key stakeholder is and their role on the project. The quantitative data from the survey identified that business leaders and those in project manager roles may have more influence in the success of the project than the other stakeholders. A close second was civilian roles in city management, which also requires an approach to managing the project in alignment with the city's business offices objectives. The elected official, who is often the most visible stakeholder, measured only be third with respect to ensuring project success. (See Appendix C for more details.)

This information guided identification of the participants to invite to the next phase of my action research, a purposive focus group (Ritchie et al, 2013; Patton, 2002). It contributed also to identify key participants by stakeholder role to include in the qualitative interview phase.

Focus Group

Focus groups (Kitzinger, 1994) are a qualitative research method often used in action research (Barbour and Kitzinger 1999; Wilkinson, 1998). They are designed to be group discussions to explore a specific set of issues and, as a research method, can generate complex information at a low cost, in a minimum amount of time, and can provide results quickly (Kroll, Barbour and Harris, 2007).

In August, 2013, I facilitated an in-person, onsite focus group (Wilkinson, 1998), to gather data that could inform the next phase of research focus. Participants were selected taking a purposive approach (Patton, 2002) to ensure representation of an informed group of smart cities' project participants. Using Appreciative Inquiry (Bushe, 2012; Cooperrider and Whitney, 2005; Fitzgerald et al, 2003) methods, I guided collective conversation and gathered information and materials relevant to my Smart Cities' research (Kamberelis and Dimitriadis, 2013) that led to identifying the case studies, key participant stakeholders by role, see Figure 3.4, and reviewing the questions to ask in my interviews based on critical literature research and survey insights related to stakeholder commitment.

The setting was a 2-hour meeting with 24 stakeholder participants in groups of 6 at four tables. The format was to work on questions at each table, document discussions and summary of ideas, suggestions, information and present findings from each table to the rest of the group.

The focus areas were covered in four rounds, due to time constraints:

1) What distinguishes your Smart Cities project and who are the key influencers?

2) What is your vision for your Smart Cities projects in the future?

3) Prioritize smart cities organizational processes that would work well. What are the areas of key focus of your role?

4) How could this be implemented and measured on Smart cities projects?

This early phase was the next deductive research that was intended to inform existing theory and to move from smart cities stakeholder commitment from a broad scope to a more specific area of focus. Participants were encouraged to contribute to the research by providing resources of information for smart cities projects, including geographic and regional interest, industry specific projects, key roles of critical stakeholders on their existing projects, reports, existing models and methods applied, project change processes, and any related technology solutions beyond IBM Smart Cities models and project methodologies.

For my setting, the focus group was structured from a common sense of purpose, relatedness, and community (Patton, 2012) for the participants to openly discuss the areas of interest and to produce new ideas that contributed to the value of the data collected. Using appreciative inquiry (Bushe, 2012; Cooperrider and Whitney, 2005; Fitzgerald et al, 2003) technique in this setting was my primary research method to generate a large amount of information in a short time from practitioners on current projects (Kroll, Barbour and Harris, 2007). I also wanted to ensure the focus was looking to the future and where the content could provide positive direction for my research instead of focusing on the past and what went wrong historically. The exchange of ideas offered both content and context for evaluation toward deducing my next steps of research and confirmed the plan to pursue case study research to understand concepts and themes of stakeholder commitment in current approaches to smart cities.

Figure 3.4. Smart cities key stakeholder roles identified by the focus group

Blended methods (Venkatesh, Brown and Bala, 2013; Onwuegbuzie and Teddlie, 2003) supported the complexity to define a strategic direction while achieving tactical execution of my action research. The insights gained from the survey of practitioners currently engaged in the smart cities arena provided guidance to frame my research problem more specifically in the case study format. It also uncovered how this case study research could impact current and future IBM Smart Cities' practices and support future positive project outcomes. Results helped to identify key participant roles to include in focus group and interview phases of research. The focus group felt there would be value in looking at diverse cases beyond IBM smart cities' cases. Suggestions for case study locations and projects were shared. San Diego, San Francisco, Amsterdam, Nairobi, and two locations in Korea were shared in addition to San Jose and Chiang Mai, Thailand. The latter two were included in this study.

Case Study Interviews

In *Qualitative Interviewing: The Art of Hearing Data*, Rubin and Rubin (2012) define the techniques of interviewing depending on research philosophy. I prefer qualitative tools of observation, questioning, and description in a naturalist mode (Rubin and Rubin, 2012).

Interviewing in my role as researcher would require respectful listening and observing the world as described by others. My interviews were structured to gather the description of events, process, and culture from the interview participants and to find themes, connections (Rubin and Rubin, p. 22), and differences in their realities that unfold in the interview process. I built my interviewing platform on theory from the critical literature review, although I left room for enough flexibility to encourage details and description, perspectives, political, social, and cultural interpretations. The interviews followed a responsive interviewing style with the semi-structured questions steering the dialogue to gain more detail and depth (Rubin and Rubin, p. 102) on the topics of the interview in discussion.

The interview is “a simulacrum, a perfectly miniature and coherent world in its own right” (Dillard, 1982, p. 152). It is an active text that gives meaningfulness of a situation in the creation and performance of the interview (Denzin, 2009, p. 217). I deemed this to be a critical part of my action research cycle methods to capture tacit knowledge of smart cities projects, process definitions, and application of technology practices that could lead to creation of new knowledge and gained understanding from the subject matter experts working on smart cities who were interviewed.

In preparation for the interview phase, I did a great deal of reviewing the application of interviewing for case studies and case study research articles. I returned to the guidance of Creswell (2013) and the structure and format of Asmussen and Creswell (1995) as a model. My interviewing structure varied for each case as my role changed on a continuum from (Jorgensen, 1989) an insider to an outsider as my research progressed.

In case study 1, I was an insider at IBM (Coghlan et al., 2014) and facilitating change in parallel with applied action research in a highly structured environment. In case study 2 at the city of San José, I was an outside action researcher and the structure was established, hierarchical, and very process oriented. In case study 3, as outside researcher, I was in the midst of an emerging structure where I was invited to observe the project in progress that was led by a services practitioner from a consulting company. I learned there was also a local team conducting participatory action research onsite, as well.

The interviews were semi-structured (Rubin and Rubin, 2012) with my original list of interview participants chosen based on their functional roles and leadership, their scope of influence on the team, closeness to the details of the projects and ability to share real-time information about the projects. My original plan had 11 interviews and expanded to 19 interviews due to

additional interviews added through recommendation of participants (see the Interview Schedule in Appendix D):

Case study	IBM Smart Cities	San Jose	Ecovillage
Initial interviews	Thought leader (SME) Project leader City manager Vendor skills	City council member Department leader Technologist	Sponsor Leader Project participant Technologist
Additional interviewees	Vendor product Business partner Elected official	Elected official Resident	Founders (2) Educator
19 total interviews	7	5	7

My semi-structured interview questions included the questions below. All questions were addressed with the interviewees though they were asked in different order in some interviews to respect the flow of information exchange and respect the interviewee's sharing. Key interview questions that helped to gain an understanding of the role of stakeholder commitment and ultimately helped deliver improvements of IBM Smart Cities projects are listed in the table below with a reference to the literature review source:

Qnumber	Question	Literature Review Resource(s)
Q1	Can you share an introduction to your smart cities project?	*Carlsson, 2012;*
Q2	Do you consider yourself a key stakeholder on your smart cities project?	*Carlsson, 2012; Kim and Mauborgne, 2005; Weick and Quinn, 1999;*
Q3	Can you share details of your role and level of commitment?	*Dooley, 1997; Lewin, 1947; Coghlan and Brannick, 2010; Stringer, 2007*
Q4	How is your stakeholder commitment influenced by your leadership style in a change environment?	*Vince and Broussine, 1996; Schein, 1985*
Q5	Are there other stakeholders on your project? What roles do the other committed stakeholders play on your project?	*Orr, 2013; Weick and Quinn, 1999*
Q6	What are the character traits of the key agents, in the role of committed stakeholder, that lead the change on your project?	*Caldwell, 2003; Weick, 2001; Vince and Broussine, 1996;*
Q7	Is you approach to work individually or in a collective manner? Within the team, the organization, across organizations?	*Ansell and Gash, 2012; Barley and Kunda, 2004; Eby, 1997; Jacobs, 1961;*
Q8	How do the stakeholders perform in a change management environment? Can you share how the operations in your organization, or across organizations are structured for change?	*Rodrik, 2014; Worley and Mohrman, 2014; Ruttan, 2001; Kilduff and Dougherty, 2000; March and Simon, 1993; Thompson, 1967*
Q9	How do stakeholders handle crisis and/or change management in the scope of the project over time?	*Caldwell, 2003; Gill, 2002; Chattopadhyay, Glick and Huber, 2001; Dooley and Van de Ven, 1999*
Q10	Are you considering the origins of problems and the priorities of the local stakeholders?	*Brockner and James, 2008; Weick and Quinn, 1999*
Q11	Are stakeholders influenced by technology and product capability? If so, what areas and how?	*Zygiaris, 2012; Palmisano, 2012;*
Q12	Is your project founded in applying technology or is technology incorporated into your project later?	*Hollands, 2013; Caragliu, 2009*
Q13	Is technology the answer to our city problems? How? Why or why not?	*Golusin et al, 2014; Florida, Mellander and Rentfrow, 2013; Cretu, 2012; Hawkins and Wang, 2008*
Q14	Are you able to improve sustainable resource management, and still focus on the goals to reverse the effects of pollution, and improve human health and safety? How do you balance this in your goal development, results metrics, and change process?	*Leonardi, 2013; Chourabi et al, 2012; Destatte, 2010; Caragliu, 2009; Gerasidi et al. , 2009; Watkins and Ehst, 2008; Orlikowski, 2000*
Q15	How do you work with government, local agencies and citizens who address these issues every day?	*Castells, 2010; Thabrew and Ries, 2009*
Q16	How does technology support the stakeholders' goals?	*Johnston and Clegg, 2012; Chourabi et al, 2012; Caragliu, 2009; Komninos, 2008*
Q17	Is technology perceived as an improvement or an element of innovation on your project? Can you explain more?	*Lee, Phaal and Lee, 2013; Palmisano, 2009; Crossan, Lane and White, 1999*
Q18	Do you collect more or less data than you use now? How do you apply the data your city collects?	*Castells, 2010; Cisco, 2010; Palmisano, 2009*
Q19	Do you perceive an innovative aspect of your project? If so, who are the stakeholders that take an innovative approach and how?	*Edwards and Gaventa, 2014; MacManus, Caruson and McPhee, 2013; Chourabi et al, 2012; Caragliu, 2009;*
Q20	How are stakeholders, as actors in the scene, impacted by economic forces and political, social, and cultural factors in your project environment?	*Rodrik, 2014; Hersperger, Gennaio Franscini and Kübler, 2014; Linde and Linderoth, 2006; Ruttan, 2001;*
Q21	How do you balance change management, stakeholder management, decision-making, and new technological complexities on your project? Is there an optimum balance?	*Clegg and Walsh, 2004; Vince and Broussine, 1996*
Q22	Have you learned new ways to make progress your project using conscientious actions together?	*Daly, 2013; Emery and Pierce, 2013; Daly, 2007; Tsoukas and Chia, 2002; Senge and Scharmer, 2001;*
Q23	How do stakeholder participants work across such a complex environment where they may share a similar vision for a better world but have different goals and approaches to getting to the end goal?	*Williams, 2014; Caragliu, Del Bo and Nijkamp, 2009, Kim and Mauborgne, 2005*
Q24	Is awareness or education important to support your objectives?	*Tsoukas and Chia , 2002; Painter, 1991; Weick, 2001*
Q25	How can we prepare others to take on smart cities initiatives that support the global change required in the future?	*Hollands, 2013; Destatte, 2010; Kim and Mauborgne, 2005; Jakobsen, 1998;*

As I moved through the phases of interviewing, it was natural to change my style of interviewing in the later phases. The first interviews were held with people that I had identified as being key participants who could provide insights into my research. I shared reasons for my research, discussed my interest in studying an area they had built a level of expertise, and in doing so found common background and shared social structure of our mutual contacts (Rubin and Rubin, 2012, p. 79).

Relationships were established with an ethic of authenticity and compassion and evolved into reaching the “intrinsic depth” (Raelin, 2003) that is required to expose as much as possible of the information and tacit knowledge for rigor, relevance, and relationship to the research topic.

Later phases of my action research cycles made room for additional interviews that I sought out based on the recommendation of an earlier interview participant and often a direct introduction as follow up to our meeting. I did not want to lose an opportunity to gain new insights after I completed my primary interviews, and swiftly arranged the next interviews, often done for me by my earlier interviewee when the introduction was made.

Final closing of each interview included a summary of what we covered, often times a joint photo opportunity, and my expression of gratitude for the time they took to share their knowledge and perspectives on my research. I told each participant that any further thoughts were always welcome, usually in person, and then followed up shortly afterward with an email. I explained that I would reach out at a review phase and would appreciate their feedback if they wanted to review the text content and analysis, graphics, photos and quotations. I mentioned several times and in review notes as well that the participant could be named by title, their name could be called out and acknowledged, or they could remain anonymous–the individual participant had the final choice and I honored their request.

Quite often, outsiders or new interested parties volunteered to be part of my research or to be interviewed (Torbert, 2013; Coghlan, 2007), and I felt disappointed to have to turn them away. However, at each occurrence, I engaged with them to share current status and to ask if I could reach out to them for future research related to this topic. The responses were very positive.

Supervisor checkpoints provided valuable research framing and guidance throughout the research process. My supervisor shared how the researcher can and should observe and reflect (Costello, 2003) on data from a different perspective during my personal researcher

"checkpoints" (Creswell, 2005) therewith increasing my reflection and offering new perspectives for interpreting the data.

The interviews and the knowledge gathered provided a real-time experience for analysis, interpretation, and action. Findings were reviewed and converted to actions as changes were applied back into the IBM case project.

Data Gathering Process

Lessons learned from coursework, research, and papers for the residencies prepared me well for the data gathering and analysis process. I had learned what did not work well from earlier research projects and I also had feedback on best practices from supervisors and peer faculty at my work.

- All online data and reports were secured on a separate laptop that I have dedicated to University of Liverpool DBA.
- Signed informed consent forms and related emails were saved to a file if received in online format. Hard copies were saved in a folder and locked in my desk. All participant deliverables when sent and received responses were logged in tracking spreadsheet.
- Part of my journal was online and part of it was handwritten. This made it convenient to make entries when travelling if I had access to one media but not another. However, at analysis, it was often annoying to me when chronology meant jumping back and forth between sources.
- Data capture for internal and external interviews were two sources. One source was the actual interviews were recorded on my iPad using a recording program, QuickVoice. The second source was notes taken during and after the meeting. Notes and audio recording was later transcribed into a saved file and the text was moved to my laptop for coding and analysis in iterative spreadsheets.
- Documents, artifacts, project notes, schedules, field notes of observations, stakeholder participant correspondence, and other evidence were kept in their original format if in hardcopy or softcopy form.
- Photos were on my phone or iPad and transferred to my laptop in a separate file.
- All electronic data was backed-up, encrypted and saved to a personal drive and locked in my home office desk.

Coding and Data Analysis

For the qualitative phases of my research, I evaluated conventional, summative and directed coding approaches (Hsieh and Shannon, 2005; Rubin and Rubin, 2012; Saldana, 2012; Charmaz, 2006; Ezzy, 2002) to familiarize myself with the coding process and decide which approach would be both rigorous and relevant to use for my action research. After reflection and review, I determined conventional content analysis would be the best approach for my action research. In conventional content analysis, codes are started with observation and then derived and defined from data during data analysis. As the researcher, I was engaged in gaining a deeper and richer understanding of the content related to the phenomenon with this approach (Hsieh and Shannon, 2005; Weber, 1990; Van Maanen, 1979). I chose not to use a software computer program initially as my method of coding in case I should risk that the programmatic nature would remove me too far from the data analysis process and results. This did, however, materialize as an additional phase of analysis in my content analysis.

I evaluated the situation and decided it was a critical part of my role as researcher to manually transcribe the source material, organize the data, create frameworks to identify codes and refine categories, and organize themes (Saldana, 2013). Coding and data analysis of information was a long, rigorous manual process using multiple Excel spreadsheets for coding and analysis and organizing the data into multiple structures. Each phase was followed by a review and reflexive process exploring meanings and interpretation of the findings.

My first interview transcriptions of the recordings in the first cycle included an extra cycle of taking note of specific quotations verbatim (Saldana, 2012; Strauss and Corbin, 2008; Charmaz, 2006) to ensure I captured the participant's reality of the situation using their own words (Saldana, 2012; Rubin and Rubin, 2012, p. 190). This was separate but parallel effort with finding emergent coding categories and subcategories as part of my data analysis.

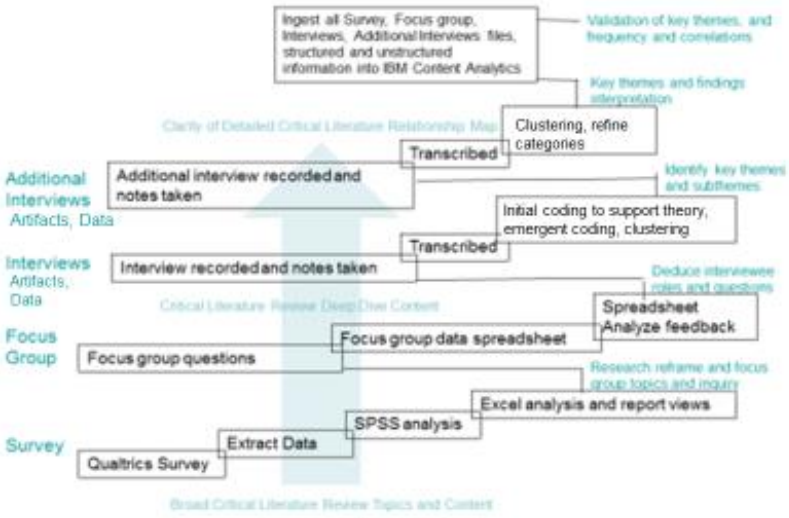
For all interviews, as researcher I also documented perceived sentiment and mannerisms, both positive and negative emotion were notes in my journal during the interviews and linked to the interview in progress. These were coded as part of the interview source material and aggregated with the transcribed interview data. These key words were coded as non-verbal expressions to capture additional insight and perspective for each interview beyond only transcribed words. This was key to ensure accuracy when identifying and explaining the meaning of the data. The unstructured content and non-verbal expressions and attitudes were an important element to capture the essence of the data collected, to organize and interpret

the findings make connections and identify emergent patterns and themes that could be mapped to explain significant behavior representing stakeholder commitment in the role.

In addition, reflections of site observations, specific words characterizing the location of my visit, summary statements of events taking place were notes in my journal notes (recording time noted) following the in-person meetings and were transcribed with the related interview source material. They were inserted at the actual time noted during the recording of the interviews to match to the topics and interview content at that specific time of the interview. These were saved to reference back and to cite the participants in the case studies.

Though I generated only three initial coding categories guided by my literature review of people, process and systems (Creswell, 2013) because I found I did not yet have a deep understanding of the data I was gathering this quickly changed. After this initial cycle of coding, sorting and weighing the input from the initial interviews these categories were later organized in a detailed next level of nine descriptive categories, from examining the materials and seeing emergent data that covered the primary topics of people (one or many), stakeholder, planning, process, policy, applications, systems, innovation. Coding of later interviews moved directly under this second cycle of descriptive coding under categories related to understanding the phenomenon of the content in these relationships, connections, frequency and trends. More detail evolved to more than 70 detailed codes. The process of categorization and interpretation of content resulted in reduction of codes and refining the coding schemes (Hsieh and Shannon, 2005). Many rounds of reflection and organization reviews of specific data sheets took place in each phase. As I progressed and became familiar making notations of the data, new content was captured in additional research phases that added incremental insight to context related to themes. Connections brought more clarity to existing relationships and new relationships and trends were idenitfied (Rubin and Rubin, 2012).

I proceeded to transcribed and code interviews, field notes, journal entries, onsite observations, and artifacts at each phase. Consistent coding, verification, and analysis was based on grounded theory (Charmaz, 2006; Strauss and Corbin, 2008, 1997) to identify themes and sub-themes. Welman, Kreuger and Mitchell's process (2005, p. 221) and to support a quantitative analysis of qualitative data was applied to expose themes.



Final themes were stakeholder, leadership, organization, quality of life, education, planning, methodology, sustainability, change, innovation, data, and technology. An additional phase of reviewing individual interviews coded earlier in relation to themes (Saldana, 2012) was made by the researcher to examine the data with this perspective and to insert key participants contributions in association with the data analysis into to the case studies. (See Appendix E. for examples of coding and data analysis capture).

An additional phase of data analysis and interpretation was added to my original plan. It followed the completion of the intensive manual coding, data analysis and interpretation of findings process. I was granted access to a software program, IBM Content Analytics, a contextual analysis tool that made available to me for my research at the IBM office. I used this software on a company machine set up for this specific instance of use only.

The objective of this phase was to identify any new relationships, connections or trends in the data using a computer program that could analyze structured and unstructured information together. I prepared my structured and unstructured content, including emails, text, program documents, transcribed interviews and related notes, text from brochures, methods and models gathered, processes, and content of artifacts, scanned and imported them into the

tool. I also included survey data from 128 completed or partially completed surveys. The software used 'out of the box' capability to analyze the entirety of subject-related information, it follows with a step annotating the content and aggregates the information into relational findings. The content is organized into categories using the content classification feature. The analysis of the data displayed key facets, mapped correlations, identified trends, patterns, themes. It also displayed a chronological timeline of when the data was collected. I noted key similarities and differences in my findings. IBM Content Analytics proved to be excellent for ensuring the validity and value of the qualitative information as part of the action research process.

The analysis validated themes and categories in my findings. The organized data tables validated critical literature research topics as they directly related to my research. Other topics were degrees away from my direct research but showed a relatedness in themes and patterns. The program uncovered additional detail relationships of stakeholders to specific industry and data related expertise within smart cities, such as water treatment, electricity, transportation metrics that could address industry issues but were subject to further deep-dive analysis. To investigate these areas for analysis in more detail, customized coded annotators would need to be created in the software program application and additional content would need to be gathered. This would not be within the scope of this research topic but may could be relevant for other smart cities' industry specific research. All data was removed and the program was uninstalled to ensure confidentiality and ethical integrity.

Action Research Cycle Four: Evaluating Action

Action Research Cycle Four, Evaluating Action, consisted of reflection, analysis and interpretation of all earlier cycles. The cyclical phases of data analysis, of each case study, combined with reflection at each phase, provided new insights for interpretation. Connections, patterns, and pathways developed in phases (Charmaz, 2006). I evaluated internal project information and discussed findings with project case participants.

When I facilitated or observed IBM case study team meetings many of the discussions included exploring new issues. We created a safe (Pedler, 2008) environment to support the internal team making significant changes required on the project based on tactical methodologies and stakeholder "how to" that was identified in my ongoing research phases. At regular intervals, we scheduled discussions to determine new changes to the project. When

applied, these changes improved IBM project delivery, time to value and overall project performance. Findings at each phase of analysis led to exploring key themes uncovered in the research cycle that resulted in creating improved processes and methods to identify actions to support stakeholder commitment and deliver new value through updated IBM smart cities project methodologies.

In addition to cyclical change on the IBM project, I was able to improve my case study research process of capturing and analyzing data more efficiently and I captured more observations at project sites. Critical analysis and reflection identified the key themes and discussion provided deeper insight and linked these themes back to existing theory from the critical literature review.

Chapter 4. Taking Action

The IBM case study was the first qualitative research phase of taking action. As I worked on the IBM case, I confirmed the information shared by the focus group that it would be valuable to gain external perspective of outside cases and bring those research findings back into the IBM team. To conduct external action research, I selected three cases to study unique instances of smart cities in addition to the IBM approach to smart cities. Sustainability was a critical element in all of the cases and is a major factor when considering any city to be "smart." All three cases looked at meeting the needs of the present generations while factoring the needs of future generations into the solutions delivered.

Hollands et al (2013) produced an article stating the real smart city has to begin to think with a collective social and political brain, rather than through its "technological tools"'. The group of researchers state that this alternative smart city exists. It is made up of myriads of initiatives where technology is used to empower community networks, to monitor equal access to urban infrastructures or scale up new forms of sustainable living.

However, Holland (2013) stated that contrary to corporate storytelling (Soderstrom et al, 2014) no straight-forward narrative about the smart city emerges from these initiatives as they can be driven by very different and politically variegated motives. "It is in this context that an alternative storytelling about smart cities is necessary." (Hollands et al, 2013). Services and proactive development strategies, whether for smart cities, urban villages, or ecovillages, promote sustainable living, although the approach may differ in execution phases and project duration.

Investigating three cases of smart cities projects offered insight to understanding the relevance of existing theoretical research and the practical similarities and differences between these projects and their engagement of multiple stakeholders. Examining different visions, leadership styles, varying objectives, and approaches to democratic decision-making helped define the optimal balance and integration of the construction of sustainable models for change (Angus-Leppan, Benn and Young, 2010) and application of technology, process, and human capital management. Different concepts and ecosystems have evolved to modernize the intelligent operations of large cities. At the same time, sustainability drives us back to the days of old and the more traditional village model, as seen in current ecovillage expansion of the 21st century.

Three different case studies (Fowler, 2013), see Figure 4.1, help to understand the concepts in actual settings:

1) IBM Smart Cities projects, where large transformational change using technology as the platform is a constant with the process of a city getting “smart-er” as an ongoing process or action (IBM, 2012).
2) Urban village concept was established in the mid-1980s as a self-sufficient, integrated community, and formalized by the Urban Villages Group in the early 1980s as “a contradiction in place, as they blend the intensity of the city with the intimacy of a village” (Fleming, 2000).
3) Ecovillages offer a form of smaller-scale sustainable models for villages that offer another model of development, usually set in rural environs. Ecovillages incorporate sustainability in a small community that is managed by local stakeholders.

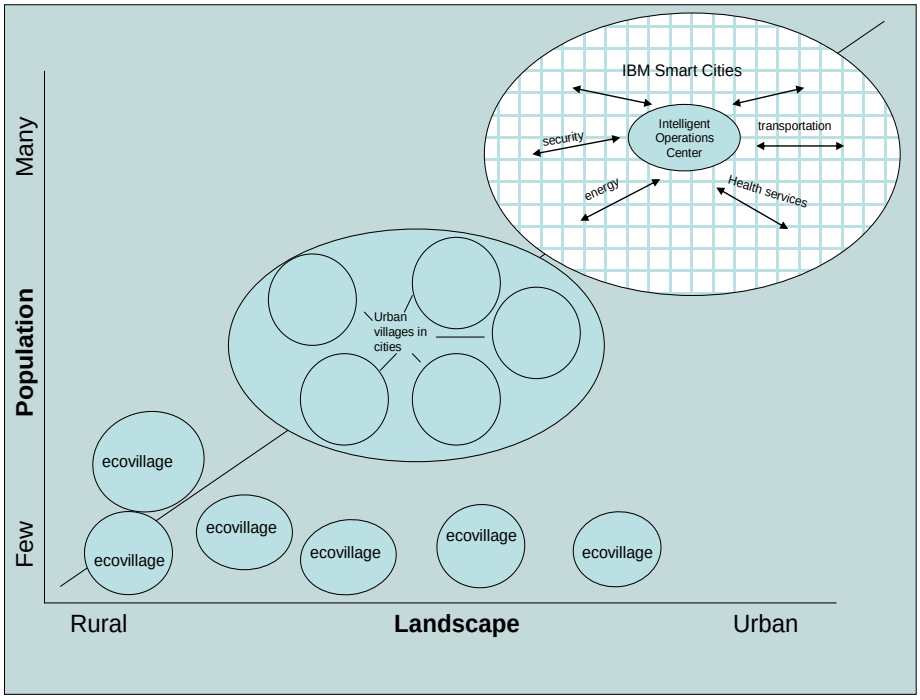


Figure 4.1. IBM Smart Cities, urban villages, and ecovillages models are mapped in relation to population size and landscape type

Case Studies

My research started in corporate IBM Smart Cities' environment with a goal to broaden perspective and bring new knowledge from alternative approaches together to improve IBM Smart Cities' projects and to contribute new knowledge, specific to the role of stakeholder commitment, across the broad spectrum of smart cities (Hollands et al, 2013).

My research of my IBM Smart Cities' stakeholder work group provided a channel to introduce findings from my research for changes across diverse smart cities settings, see Figure 4.2.

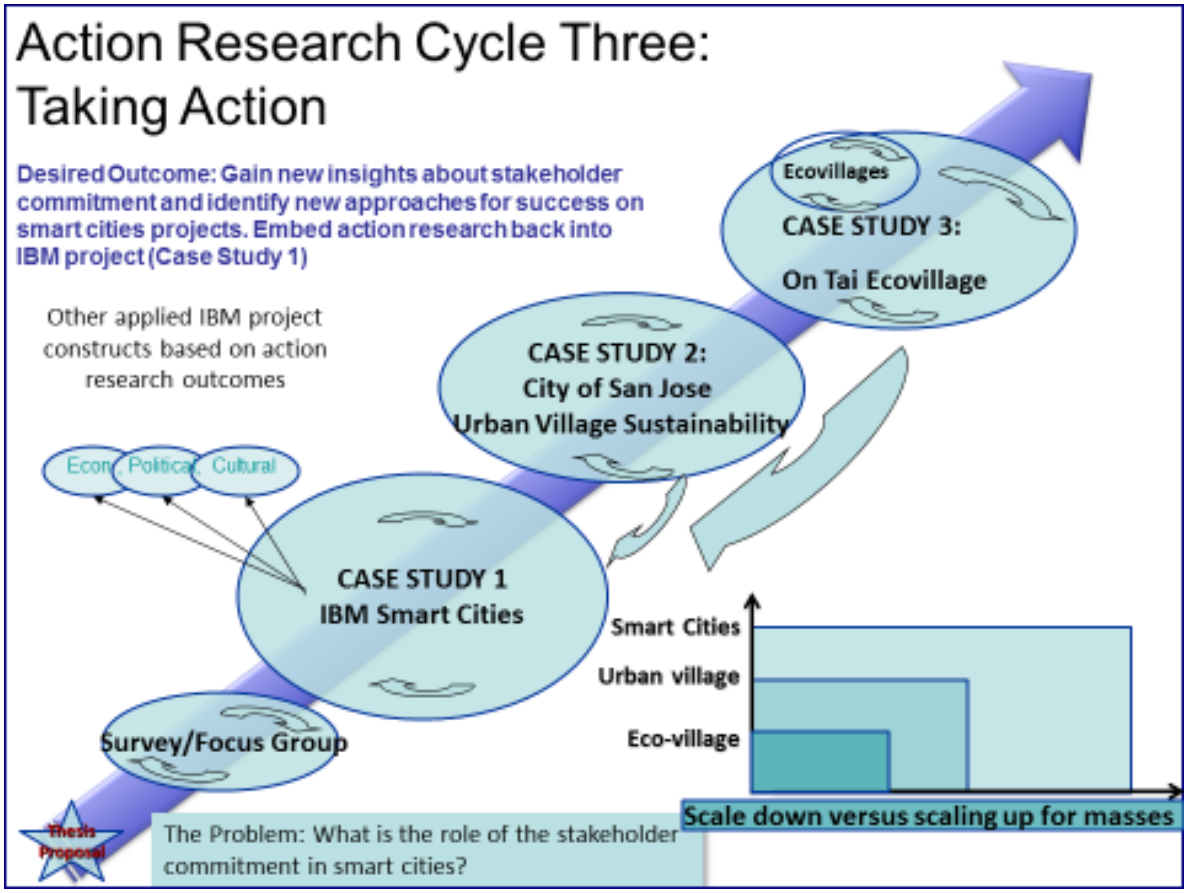


Figure 4.2. The case studies aligned with action research cycles and reflexivity

Case Study 1: IBM Smart Cities – Asian City Solution – Health Services Transformation

This case study of an Asian City health services transformation solution shows the emphasis of the stakeholder commitment on the economic factors that drive a technology project to be scaled up for major growth to support the mass migration of the population locating to this

urban setting. The infrastructure of the city needed to be updated and improved to handle the capacity and increased health services cases with larger volumes of data to ensure efficiency of local government to support the community. The project required having collective vision and view of insights while applying the technology to support the needs of each individual citizen by connecting multiple public sector stakeholder organizations.

IBM is a technology solutions company that is headquartered in the United States, with approximately 430,000 employees across the globe. IBM is a product- and solution-driven company and maps what they build to key stakeholder purchasers and their mode of commitment in many technological areas of transcendence. IBM provides a competitive advantage to organizations by offering consulting services for defining leading-edge strategies and delivering services and product solutions for implementing technology to drive the success of those strategies.

IBM employees' value:

- Dedication to every client's success
- Innovation that matters – for our company and for the world
- Trust and personal responsibility in all relationships

(IBM Annual Report, 2013)

The project scope and goals were strongly influenced by the technology and products that comprise the IBM Smart Cities solution. The team mission was to develop a customized health services solution with another Asian entity and create a plan to positively impact efficiencies and operations in delivering health services to a large population of the community. This large scale project is for millions of citizens who access the system as users. Security and privacy must be of the highest quality as the data is confidential, personal information. The development team leveraged existing technology assets and programs in place at the client

site needed to incorporate change, new technology systems were added and processes were updated to handle the capacity required for the city's forecasted growth, all while operating within the limited budget constraints. Government and local authorities delayed making any incremental changes to a very outdated system due to resource management and the required scope to scale the system for the growth forecasted. This is a multi-year, technology-driven project with change management incorporated across many parts of the city infrastructure.

In 2013, as an executive in the IBM Industry Solutions business unit, I learned about this IBM Smart Cities opportunity in Asia that had stalled and had no "team" to pick up the bid. It was at risk for being abandoned and no further action would be taken. I was asked to review the situation and consider taking a leadership role. Upon investigating the reason for this project not moving forward, I learned there was a history of an earlier project failure and many of the same stakeholders were assigned to this new project.

A postmortem of the previous project exposed key stakeholder owners, including IBM software integrators, software solution providers and device vendors, were not aligned and committed early in the project. Detailed integration and ownership were topics of continuous discussion, but conclusive 'move forward' plans were never put into place. In addition, the client was resistant to the change and to the introduction of risk to normal production that was required in the timeframe when some of the key project switchovers would need to take place. The combination of the hesitancy to act from all sides, whether not invested and committed to the plan and technology or stuck in analysis paralysis because of a high aversion to the level of risk required to change, was apparent in every aspect of the project meeting minutes, planning documents, and action items in the team database. Documentation artifacts revealed lack of project and stakeholder commitment from the start contributed to project failure.

As practitioner, I stepped in to take on this new project and chose this as a case study for mu action research setting. I participated as insider-researcher and team member from the initial meeting for this project.

- The team kicked off the project by reviewing archived materials from the earlier project and through a series of inquiry sessions (Evered and Louis, 1981) determined what could be repurposed and what was missing
- The experts initiated a round of meetings to identify and assemble the existing subject-matter-expert knowledge.

- The team lead created a team room repository for the documents and images to be shared.
- Team member stakeholder criteria and commitment levels and expectations were established regarding attendance of meetings or providing a mandatory backup to attend in place of the core team member.
- Performance expectations for each individual contributor and reviews of expectations at each phase of the project proposal stages were established as part of the project checkpoints.
- The core team spent two days in a stakeholder workshop (Nielsen and Svensson, 2004) understanding the key customer problem and their role on the project. Key discussions identified the requirements for socioeconomic viability and the need to improve the delivery of human health and safety services. They assessed the current state of the environment and the delta of what it would take to get to the client's desired solution and outcome. There was an inter-level dynamic (Coghlan and Brannick, 2010) of the project team when the core team was created, and then the extended team was identified. Expectations, assumptions, and dependencies were defined across the five core stakeholder companies that were engaged on the project.

IBM is only one of many stakeholders. Our name and brand is attached to the projects yet we rely on so many different entities to make a Smart Cities project successful. IBM stands apart from others with regard to technology innovation and methodologies in Smart Cities when the projects are large-scale implementations. The IBM initiative extends beyond the actual project boundaries of this case study. It is integrated into our corporate vision, corporate social responsibility (Williams, 2014; Golub et al, 2014), sustainability (Burton, 2001; Basiago, 1995), and provides a pragmatic approach to solve problems and implement key technology differentiators. This helps IBM stand apart for the people we are helping in the cities.

In addition, the scope of this project is very large. The number of stakeholders, when we include the end use, is too large to represent individually and must be looked at as a group. The investment in IT and infrastructure systems required changes because it was a "living process" to be a smart city. There were more considerations beyond the immediate project needs: economic, eco-social, cultural, and other factors need to be considered at each phase.

Each stakeholder company shared their perceived economic drivers for this project and their view of the political landscape (Hope, 2010). For example, who could be most helpful in solving a contract problem, and who knew the release of funds for each milestone defined on

the project? The team shared observations good and bad, including perceived benefits and potential limitations for the project. It took multiple rounds of action inquiry (Weick, 2001). At times, the atmosphere was combative-collaborative and eventually the dialogue moved into appreciative inquiry format (Bushe, 2012; Drew and Wallis, 2014) as the team began to drive to move from individual stakeholder goals toward a larger common goal. The team developed a plan, a schedule, and required project content as a cohesive team with all members focused on the common objectives of the project.

Regular checkpoint meetings of all stakeholder members were held and each person was asked about their responsibilities. Were they on track to deliver? Did they have any issues for discussion? Each individual was invited to go to the project map on the whiteboard at any time and call a “group discussion” pertaining to any proposed change of plan. Everyone needed to understand all levels of the change, how it would affect the project, and whether any member of the stakeholder team would be impacted.

A situation arose that required trans-organization conflict review. The team was discussing the nature of the healthcare data being collected, who would have access and how would it be used. The US employees are very familiar with HIPPA guidelines that regulate privacy and security of patient healthcare information. However, our work was not being executed in the US. As an international team, we needed to agree how to respect and follow the regulations and apply scrutiny of patient data per our guidelines while still making project progress against goals and objectives in a country not regulated by HIPPA.

The team shared data and debated and discussed actions. Sub-teams created new methodologies for this Smart Cities project. The appointed team leader supported operational aspects of the project, although another individual emerged as an influential leader and motivator of change, supporting the investigation to include new ideas and introduce innovative aspects of the project. This format of teaming was complementary and the client commented at one meeting that he appreciated the productivity of the many companies working together for his project. A vendor partner member owned the technical construction of the proposal being built for the project, while another member of the team owned the repository for sharing information. The IBM team leader owned the communication and organization of vendor activities related to the project while not limiting their leadership contribution.

One key exercise that the team developed during my outsider-research cycle was to discuss how they needed to make a focused effort to ensure that all stakeholders on the project creation side were continuously viewing the project from the client stakeholder perspective and defining details of the processes with the client stakeholder in mind. At each meeting, someone usually spoke up in an effort to challenge an issue from the perceived client perspective of what technology components were critical and at which phase. Following these discussions, the group tended to move faster through the decision-making process together toward their common goals. When there was disagreement amongst the group members about the client's potential issue, the team's progress was delayed. There were situations where disagreement brought out stronger personalities who often pushed their viewpoint because they were louder or more forceful as a member of the team than the person in opposition.

However, on one occasion when the team was mired in conflict and disagreement (Kuhn and Poole, 2000) about the change management scheduling and the sizing of a new technology application and how it should be implemented, one of the more analytical but reserved team members insisted that the team take a pause. He shared that neither of the opposing sides was representing the correct stakeholder view because this phase of the project required another stakeholder from the client team to participate. No one knew definitively what the stakeholder position should be in this particular situation, yet they were all speculating based on earlier assumptions. Furthermore, the question was raised as to whether that particular stakeholder had a high enough level of influence to approve the technology purchase and implementation timeline, as assumed, and whether this should really be prioritized ahead of other key stakeholders at the client. This introduced additional stakeholder complexity in the levels of management at the client although the driving force was to get conclusive approval for the technology contract, purchase, and implementation.

This was a turning point in the project. When everyone agreed that they had lost track of the key stakeholders because primary stakeholder owners within the client changed with each phase of the project plan. There are technology stakeholders, project stakeholders, financial stakeholders, and more. For the particular line item being defined, it was not the same people who could or should make a difference for the city operations related to the technology being implemented. The commitment needed to come from the relevant stakeholders of the task.

During my action research phase (Argyris, Putnam and Smith, 1985; Creswell, 2013), I worked with the team and discovered where problems arose when the group did not have a view of

the stakeholders and there was no system or process for tracking stakeholders to each project phase. However, little or no existing research was available to provide the team with guidance about stakeholder management in smart cities environments or to take the next step and document and secure the commitments required. The contribution to the research underway could positively impact future teams, and an action item was documented to create a revised stakeholder priority list.

Lists of various stakeholders were created during the beginning phase of the project and notes were taken about their key priorities for the project depending on their roles, whether government officials, opinion leaders, nonprofit organizations, residents, or local business owners, to gain their understanding of key opportunities and the challenges facing the development of the smart city environment. IBM, the partners, and the vendors all captured the stakeholder's economic perspective while other factors were excluded from the focus. Priority focus was limited to time, resource and budget limitations of the project, and how they would 'convince' these key stakeholders to drive and adopt broad-based change.

No one wanted to repeat the loss of the last project, so all agreed to approach the project differently and engage the stakeholders more closely. This meant engaging with stakeholders from more than just an economic perspective, and the stakeholder list became a table with additional columns for other factors including political, cultural, and environmental. As the team progressed through the project, more specific details about the engagement and level of commitment of all stakeholders were tracked and recorded.

On our project, five key tiers of stakeholder commitment levels were identified.

1) The *sponsor stakeholder* – source of funding, highest level of project sponsor, not actively engaged in day-to-day actions.
2) The *leader stakeholder* held a high-priority, core leadership role, deeply engaged owner of critical tasks with influence over resource allocation and project direction. This role requires an ambidextrous (Dess et al, 2012) approach to balance long-term goals with short-term results while maintaining oversight and careful, continuous balance of:
    a. Change management process
    b. Trans-organizational factors and people resources
    c. Assessment of technology and innovation incorporation to allow the change required for specific project objectives to be successful.
3) The *implementation stakeholder* included architects, specialists and services resources with specific subject matter expertise to attain project objectives

4) The *public stakeholder* participant provides opportunity for external stakeholders who may not be owning parts of the project to get involved by providing feedback and participation at the individual level. This level of engagement from stakeholders affords the project owners the opportunity to gauge public response to the proposed changes before, during, and after and to keep dialogues of communication open to all stakeholders.
5) The *end-user stakeholder* and recipients of the end services provided by the smart cities project.

During the first few weeks of planning the project, meetings were held at regular intervals and I attended as insider-researcher and team member. I observed that when things were progressing well there was a relaxed view and welcoming attitude toward my research activities. When issues arose, I had nervous participants ask me how the conflict would be represented in my research. I did not want them to focus on the research but I was aware that they were distracted. At times, I wondered if they were offering a contribution that was more of what they thought I would want to hear or if they were making a contribution that was truly their assessment in the moment.

One participant on the team asked me who would see the notes I took. They wanted to know if the information would be used to make resource changes to the team during the project. My observations of the project changed dramatically when I was an insider-researcher and team member with potential influence over their roles/responsibilities as part of the team. Later, when I moved to a new area of the business and returned to attend the meetings as an outsider-researcher, people had a more relaxed attitude to the research.

They trusted me when I reassured them of the purpose of my research and were more comfortable speaking candidly when I was outside their management line. Some key individuals even seemed more socially comfortable and shared more openly and often where they seemed to have been held back in early weeks of the project.

This phase of action research resulted in changes on the project. Findings from later phases of action research were shared back into this project and influenced new approaches to capturing project progress with key stakeholders to increase the success of this Smart Cities project. This project will continue for multiple years and have many milestones and phases of expansion. New methodologies and processes have also positively impacted future projects.

Case Study 2: Sustainability Green Vision and Urban Village Model at City of San José, California

This case study of the smart city of San José provides a view of the public and private sector partnering as joint stakeholders to support a growing community. The city is confined to a limited space yet is predicted to be double-digits. The city is proactively identifying the key areas of change required and finding stakeholders in Silicon Valley tech that will align their technology and innovation with the new sustainability goals of the city. Economic planning is scaling up for planned urban growth though the city is changing the infrastructure to support local environs and, thus, scaling down for sustainability and deeper local cultural engagement by provisioning a village environment.

San José, California is the tenth largest city in North America and has 1 million residents and approximately 6800 employees. The city is situated in Northern California and reigns as the "Capital of Silicon Valley," sharing the representative characteristics of global innovation and exhibiting the entrepreneurial spirit of Silicon Valley.

"We are home to people from all around the world who focus on what we have in common rather than our differences. And together, we can ensure that San José remains a safe, vibrant and prosperous city for years to come."

(Mayor Charles Reed, 2014)

San José **City Mission**

The Mission of the City of San José is to provide quality public services, facilities and opportunities that create, sustain, and enhance a safe, livable, and vibrant community for its diverse residents, businesses, and visitors

(City of San José, 2013)

San José is faced with a 40% increase in population by 2040. This growth drives the need to continuously improve the current environmental plan and prepare for the expansion into the green belt around the city. San José does not have 40% area to grow with the population, so they need to revolutionize their approach to anticipate the growth.

In strong mayoral forms of government, initiatives are usually handed down from the mayor's office and end up being boom-or-bust types of activities. Change is short and immediate, as in crisis resolution, or it is slow and unapparent. Discussions usually follow and at times a task force is formed, a press release is issued, and then the initiative makes slow progress, but may not ever progress to the point of conclusive, successful actions.

San José is not organized and headed by a strong form of mayoral government, where the mayor carries the power and final decision, and the power does not lie in the hands of political appointees in San José. The success of San José city management depends on the contribution of all of the hired civilian resources. The professional staff members who gain expert skills in their roles are employed by the city and their employment is not linked to any period or term. This can be an advantage in city government because they can stay longer than most city leaders and more collaboration and compromise can occur when politics is not related to votes and re-election distractions. Civilian employees can also be removed if they do not perform their duties to meet objectives.

Interviewees shared that the city has already experienced a tremendous amount of growth in the last half century with a city council governance model. According to the ICMA (International City County Management Association), San José is the largest city that is still operating under a council form of government. This provides a benefit to the return on investment, speed of execution, and measurable results when making change as opposed to most government organizations, where change timeframes required do not map to the time schedules of elections and elected officials' terms of service.

From an ethical perspective, the city of San José is audited via independent reviews and provides reliable, accurate, and timely information to the City Council, the general public, and other stakeholders. The auditors work with the City Council, administrators, and the general public to decrease spending, save tax dollars, increase revenues, and improve the management of programs in line with the goals and objectives defined for the city.

Beyond that, the city gets its allocated funding from federal sources and leverages other programs that are offered by federal and state government programs. The local structure is strong and effective and the employees of the city of San José have strong communication vehicles to inform the local companies, entrepreneurs, and innovators when there is a possibility to get fast tracking with federal support or local seed funding. Ensuring the

continued success of these processes allows city employees to focus on their city instead of having to travel to the state capitol in Sacramento or even farther to search for more funding. They stay locally to work on the local environment or to drive influence and represent changes by feeding the requirements back to a federal level, which will ultimately help back in their local environment.

The Mayor, the City Council, and all the city employees adopted a pragmatic approach, a supportive organizational culture, and an integrated process to manage goals and objectives. They agreed to spend taxpayer money locally where it makes the most sense. They are all clear that local change has the biggest impact on the residents of San José and this remains the main objective of the employees of the city. They are chartered with the responsibility to respond through change to meet the stakeholder demands that come with the continued fast-pace growth that is expected for the city over the first half of this century.

A critical change took place when the San José City Environmental Services group was founded in 2006, after an absence of any environmental focus for years. The City Council continued further on the mission to define and send clear messages about what they were going to do and demonstrate how they work together to drive change that can monitored using performance metrics and that shows real value.

Several initiatives have been introduced over the last decade to keep that focus close to the city and meet the needs of the people (Appendix G). San José city employees were “smart” and took an innovative approach and created common goals toward “smarter sustainability.” These are strategically interlocked through complementary objectives introduced and updated over several years:

- Green Vision: A 15-year plan to change the environment and improve the sustainability of San José
- ProspectSV: A non-profit innovation center where entrepreneurs and business owners can develop, build, and test their technology and establish an agreement to use San José city as the first platform of delivery
- 2040 Urban Village Plan: A guiding plan to develop the land of San José toward an urban village model of economic and ecological sustainability

Based on experience in the public sector, research participants agreed that it was up to the employees and residents to drive change, not the elected officials, who would not have been motivated or rewarded in their limited term to take on any of these challenges. Although these

challenges could bring innovation and change to San José, they require vision and long-term, steady execution. Research participants also felt that the innovative personality of Silicon Valley lives in the people and that the influx of new growth is comprised primarily of young, creative types who are more comfortable with risk, change, and technology, as needed.

Green Vision

Mayor Reed introduced the concept of a Green Vision in 2007. The City of San José's Green Vision is a set of objectives intended to improve the environment and revitalize the economy over the next 15 years. The city is tracking new jobs that are created as a result of the plan, currently measured at more than 4500 jobs.

The Green Vision will transform San José into the world center of Clean Technology innovation, promote cutting-edge sustainable practices, and demonstrate that the goals of economic growth, environmental stewardship, and fiscal responsibility are inextricably linked. In October, 2007, the City Council adopted the Green Vision, comprised of ten aggressive goals related to jobs, energy, water, waste, trees, and transportation.

In San José's pragmatic approach, it was important to the City Council to show results, so goals had to be readily measurable. They agreed that it was a Green Vision that demanded steady attention and ongoing, actionable change to be successful.

The City Council chose areas of focus and set goals with the understanding that there would not be any general fund investment. To avoid the risk of inertia after planning, the team put actions for each goal into motion that were readily achievable and then they could do "things" bigger when they were longer into the strategy execution.

San José does not have an activist culture, so there were no movements in the media for or against the initial plan. This could be seen as positive or negative, depending on how the City Council and employees chose to proceed as they took action for change. The City Council and appointed department owners discussed how to proceed to make the best progress on the goals for the people and the land, not the media. They made a firm decision that even though there was a great deal of 'noise' to push them in one direction, they did not think that jumping on the climate action bandwagon of common sentiment would get them the desired results the fastest. They chose not to follow trends like many other cities at the time, and agreed that it would be closed-minded to consider only the solutions that were getting the most visibility.

However, the Council recognized that depending on how the city behaved toward making the Green Vision real, they could create jobs related to improving the environment, so they needed to make progress on each goal and send the message to the residents of San José that movement was taking hold toward a *greener* San José.

The Council created plans, measurable actions, and owners related to each of the Green Vision goals. Each goal has a primary council officer and primary department owner. The offices collaborate across their ownership responsibilities to ensure that they can lead a citywide effort and governance via steering committee. For example, one office owns goal 6, but shares responsibility to deliver on goals 2, 3, and 5, and stays aware of changes and updates to goal 4 only through committee updates.

The Council must be transparent, as defined in their mission and goal creation, to show the value they are bringing to the Green Vision. They must show the delta improvement year-to-year in the Annual Report that is published and available online. The change year-to-year is clearly documented in writing and the delta is shown visually so that progress or lack of progress is easily accessible to the public. A council member and a department leader both shared that knowing that the actual measure of performance is being documented and shared with the public is a motivation to stay on track to make progress on the goals. Stakeholders tend to collaborate quickly to find solutions when they are ‘stuck’ so that they can get ‘unstuck’ and move forward to show progress in the next report.

Creating new jobs in the process was crucial to the strategic planning of the Green Vision because the few remaining factories and manufacturing plants in San José were making an exodus out of the region. It made sense that when fabrication jobs left the area, there would be loss of revenue to the city, vacant facilities, and people out of work. New jobs in environmental areas of focus were needed, so this created yet another urgency to act on the Green Vision.

The vision is complex. It requires working with partners and vendors and finding common ground toward the goals. One such stakeholder partner is the local gas and electric company, PG&E. Other partners are local private and public companies because San José wanted to be strategic in including high-tech firms that could infuse innovation and create new approaches and jobs. The stakeholders to the success of this expanded to include the Mayor, the City Council, the city employees, public and private businesses and their employees, real estate investors, land owners and landlords, and residents. Just about everyone held a stake in the execution and a measurable successful outcome.

One way for stakeholders to re-invigorate their commitment is to attend the City Council sessions that are held each March to review the Green Vision and be active participants in updating the forward plan with any adjustments or changes that can help the goal. This meeting serves as an open platform for new suggestions related to the goals. If an idea is innovative but not proven and therefore not ready for institutional funding or full engagement, the Council can ask more questions and get more insight.

One instance of frustration was shared by a technical department leader. He stood up and paced the office as he shared the amount of effort taken to involve the public and elicit participation at one recent city meeting, and the little feedback received due to lack of attendance at the meeting assumed to be due to a sports playoff game. He contrasted this with all of the extra work hours and effort required to ensure two-way communication during the highly publicized protest, Occupy San Jose, which caused considerable disruption at City Hall and impeded government initiatives just a year earlier, by just a small percent of people who wanted to protest social injustice. He felt these same people were not willing to engage with city planning and proactive initiatives.

The Council can add new plans to the back-end of the current vision. An idea can be approved for testing in maybe one-third of the city, feel out the proposal, seed out to the people and gain initial knowledge to adjust the plan if needed. In this way, the people are the first plan of record before fully incorporating a change if it is yet to be proven.

These action plans give the Council and team direction to move forward and also give local government and residents a chance to contribute to the leadership as committed stakeholders. In this same way, the locals also take on accountability for the success of the projects.

The Council is a very active stakeholder group. Most of them volunteer to lead multiple activities. They are a driving force of the change and they know that if they do not take on the commitment in their leadership role and “show” the people how San José can lead, then they are not making the progress and seeing the results that they want to see. At planned reviews, if there is no action in a one-year period, corrective measures are put in place. Issues are almost always resolved unless the problem cannot be fixed, and new feedback offers reasons to re-define a direction.

The team takes an attitude of strong communication and they do not understand the concept of not having community outreach. Multiple participants stated that it is “not our way” not to

share information and receive feedback. “It is the only way we know how to do it – we need to get feedback” was offered by a member of city council.

One example of the essentialness of this feedback relates to a direction that the City Council was taking to go “off the grid.” They received emails and feedback at meetings from residents that this was an important issue to address. The subject was also receiving a lot of focus in the press in other cities as a responsible and important direction that city officials needed to act on. San José City Council shared this idea with their partners and the community. Many people liked the idea and wanted to be part of the action plan, but no one could define a roadmap to get San José completely off the grid within the 15-year Green Vision plan.

PG&E, as large partner to the city and stakeholder, participated in ongoing working sessions with the Council to hear what they wanted, and in the process together the partnership was able to reframe their goal. While it would be nearly impossible for the city to go completely off the grid, everyone agreed that it was important to take serious actions to balance the use of energy through dramatic efforts to improve energy efficiency. The feasibility of this goal was defined with more realistic measures such as “reduce energy use by 50% per capita” and “build a plan to attain a 100% renewable energy via PG&E partnership” with milestones each year toward this more realistic and attainable goal.

Once goals are defined, the goal leaders seek to put actions into the hands of the citizens in the most understandable and achievable ways possible. Goal leaders are passionate about the goals and they drive to them to beat deadlines. The owners are encouraged to build a plan with the expectation that they have no budget to support the effort, so they need to think about how they can meet the objective with more creative means than expecting money to fix everything.

In one example of this, the goal (in actuality) is to reduce pollution in the city. This means that less city driving is required. The team needed to think of ways to get people to spend more time out of their cars each day. Less driving means less pollution. The “path” to the solution came through very creative thinking. The way to reduce pollution was to reduce traffic, reduce vehicle miles. This led to *Goal 10: Create 100 Miles of Interconnected Trails*, which spurs walking, biking, and nonpolluting outdoor activities. A by-product of this goal is that citizens are practicing a healthier lifestyle and living better. They are also active participants in creating the 100 miles of trails as volunteers and participating in groups that, for example, “sponsor a mile for cleanup” on a regular basis.

The goals are purposely written as an end-game goal in real-person language. Although policies, regulations, and complex environmental terminology and programs could be referenced, the Mayor and Council wanted to ensure that everyone could understand and feel a part of owning the goal.

They use “Mom” as a benchmark. Would Mom understand what the goal is? Could she act with a sense of responsibility and behave in a manner that would help drive results toward the defined goal? The team chose “Mom” as part of their conceptual picture because of the characteristics that a mother represents. She is pragmatic and cares enough to ask many questions and understand the situation thoroughly. “Mom” will make sure the team does their homework and ends up with a solution for all and that it is also a clear, applicable, safe, and sound goal for all.

Goal 5: Zero Waste is an actionable goal that can be resolved through many actions of varying scope and it does not require one large solution. It is manageable and measurable. However, there was no budget for it, so the Council needed to be creative to act and find solutions. To support this effort, the Council built a team and puts energy into it. They invite private industry to participate and make it convenient for private industry to know what to focus on as part of the city initiatives. All of this is communicated clearly. The city provides a timeline for goals as well. They bring forward an initiative, define goals and timelines, and then private industry puts money into it. Local businesses know what goals will pay off for their business and they design and deliver to meet the goals of the city. The local businesses know which part of city objectives they need to meet and they bring in solutions. Everyone is more active with targeted goals and less passive from both city and private industry sides.

The city may not have the money but they can help in other ways such as by issuing permits or granting access to land and sites that may accelerate getting a job done, or by providing necessary city equipment or resources. Private brings the investment. Both sides can support innovation and entrepreneurial initiatives.

This offers a direct path right to the Mayor’s office and is in line with his vision. The Council learns about it quickly and can support the effort and track progress toward their goals. Private industry is always in line with how the market is changing and brings the best technology or process forward. They make suggested input to the city to review and revise plans as well, if needed. The close interlock allows for progress in policy, initiatives, and adoption of technology from local companies.

The city also has grant money that they provide to nonprofit organizations. The city does not want to do or own the work but they may want an action to take place. For example, San José wants a greener city and they allocate $50,000 to the budget for more trees, but they do not hire all the resources and build an infrastructure to do it. Instead, they grant the money to a nonprofit agency that plants the trees and benefits from the city's support. This strengthens the entire ecosystem and saves the city unnecessary expenses on resources.

The city of San José opened a patent office in city hall to support the local inventors and innovators and prevent them from having to fly to another location to secure patents. By staying in San José, they are also encouraged to work with the city of San José to create, produce, and gain acceptance in their home market.

These approaches are how San José expects to grow the city and incorporate their smarter approach through their Green Vision for a sustainable future. The individual changes might seem small, but they are well coordinated and all align with the 10-goal Green Vision. This allows the Council and employees to work toward the goals and stay focused. They interlock efforts toward achieving the vision. If something needs to be revised, they all contribute to reviewing and revising as needed. The balance remains strong because of stakeholder focus. This also cuts bureaucracy and supports ongoing systemic change as needed to reach a common goal.

The City Council sets direction and, once approved, the directors of the departments execute on the defined goals. To socialize the plans out to the greater population, formal documentation is shared as part of the ongoing Green Vision. The city of San José shares publicly the key priorities. While many cities focus on open data and how important open data is, San José manages the data internally for now to find out what is needed for the city: "We would rather analyze our data combined with looking around us and seeing what is happening. We do not need only the data to tell us there is not enough water and that we need space for growth. We know the major issues and then we can use the data to give us insights as to what to do about these problems."

ProspectSV

In 2014, San José launched another partnership with a foundation and facility set to provide a "first-of-a-kind" creation and demonstration policy.

ProspectSV shares: Critical infrastructure and affordable space for clean tech companies seeking technology demonstration and prototype opportunities – providing commercial trials for innovators to test technology solutions and helping attract private capital investment… and provides onsite workforce training and exhibition space to embrace a wide range of non-profit, industry and public agency partner needs. (ProspectSV, 2014)

ProspectSV is a safe development of 'smart' for the city of San José. It was created for the people as a nonprofit organization. The feedback from companies is amazing because they now have the opportunity to know what San José is looking for and then co-develop with the city for mutual benefit.

The San José Environmental Services Department established the Environmental Innovation Center (EIC) building in an old run-down building that has been resurrected as a "clean building" that showcases energy- and water-efficient practices and processes. It also provides jobs and represents some of the newest innovation happening in Silicon Valley. Sponsored by the city of San José, this "first-of-its-kind green enterprise" facility makes space available to city residents and area entrepreneurs who create new innovations related to the 10 goals of the Green Vision, including diverting waste from landfills, creating clean tech jobs, retrofitting buildings to be green, and replacing streetlights with smart zero-emission lights (San José, 10-point program). These start-ups partner with the city as they are invested in supporting the city's economic and environmental mission by bringing new innovation and the city hosts them and supports their endeavors to get tax credits from the federal New Markets Tax Credit program.

Members of the ProspectSV board are also employed by the city. The Executive Director of the organization is accountable to the city of San José. All pilot projects for the city will be led by ProspectSV. They have a facility, go-to-market skills, and will run proof-of-technology process for new clean technology and related services and help them through the lifecycle process to commercialization. This joint venture approach between the City of San José and ProspectSV was created to serve the residents of San José. They bring an innovative, entrepreneurial, and educated perspective to incorporating "smarter technologies and processes" in the city. ProspectSV provides a site and space for others to introduce their technology and the city benefits when the technology is integrated and applied to support the sustainability of the city.

When I asked for more insight about the commitment of the stakeholders and the council that is steering this effort, my contact shared that the council meetings are all “live broadcast” for several reasons:

- Accountability - Holds the council and each member accountable for their objectives and actions related to the initiatives
- Engagement - Offers transparency in planning and delivering services on behalf of the community to engage the public as active and committed stakeholders
- Education - Provides a way for the community to be informed and to actively step up and participate in the related activities

The council prepares for the sessions and sends out formal notification via multiple social media communications that a council meeting will be held.

2040 Urban Village Plan

San José city also worked with architects and planners to create the Urban Village Plan, a plan that seeks to address the city’s limited space and the forecasted 40% population growth by 2040. Planning for the environment and measuring the traffic in a large urban city is an important part of creating sustainable growth plans. In the Urban Village Plan (2015), people will be encouraged to live, work, and play all in the same part of the city area.

Villages build what they need to stay self-contained in day-to-day living–a self-sustaining concept. San José’s future and the Urban Village Plan are important. The city is building the Urban Village Plan around twelve major strategies that encapsulate the vision, including land use and transportation goals, a physical development plan and related policies, and the expansion of city services.

The Urban Village Plan complements the goals of the Green Vision plan. For example, Green Vision Goal 10 (interconnected trails) can also be seen in the Urban Village Plan’s major strategy 5, which is to “promote the development of Urban Villages: active, walkable, bicycle-friendly, transit-oriented, mixed-use urban settings for new housing and job growth attractive to an innovative workforce and consistent with the plan's environmental goals” (City of San José Urban Village Plan, 2015).

The crux of the Urban Village Plan is to break out the larger city into smaller ‘village’ areas that allow public services, commercial businesses, and residential dwellings to be in close

proximity. Employees can be residents, walk to work and other service centers, and have greater mobility. The plan supports:

- Mixing residential and employment activities
- Establishing minimum densities to support transit use, bicycling, and walking
- High-quality urban design
- Revitalizing underutilized properties with access to existing infrastructure

The urban village planning process will mobilize local neighborhoods to contribute to the larger sustainable smart city. A strategic and economic assessment of each area will be developed in the plans, and engaging public-private partnerships will enable the creation of the infrastructure to support the forecasted population growth. By planning this well and early, and involving stakeholders who can implement the plan, economic prosperity can begin and continue to grow in the future. There will be no need for crisis because the city has planned for opportunity. This opportunity presents itself while upholding the protection of the natural resources and the environment, as accounted for in the plan. To successfully implement the Urban Village Plan projects (Franklin and Tait, 2002), the city must engage early and ensure successful stakeholder engagement with their local developer community, property owners, residents, and business owners.

Case Study 3: On Tai Ecovillage Thailand

This case study of the On Tai Ecovillage Thailand provides a view into the development of a "think global, act local" community where external stakeholders contribute through skills and assets to strengthen the local community, therewith bringing global vision for local action. Private sector leaders are financing the economic factor and partnering with local village stakeholders and government to support scaling down. While avoiding mass migration to cities through local restructuring, the planning ensures economic, cultural, and spiritual sustainability in a sacred region. This plan preserves national treasures of the Thai Buddhists and supports the village prosperity through growth and change. This case embraces the potential power of local action giving insight to global methods toward sustainability.

Global Ecovillage Network (GEN) Goals

- To advance the education of individuals from all walks of life by sharing the experience and best practices gained from the networks of ecovillages and sustainable communities worldwide.
- To advance human rights, conflict resolution and reconciliation by empowering local communities globally while promoting a culture of mutual acceptance and respect, effective communications, and cross-cultural outreach.
- To advance environmental protection globally by serving as a think tank, incubator, international partner organization and catalyst for projects that expedite the shift to sustainable and resilient lifestyles.
- To advance active citizenship and community development by coordinating the activities of regional ecovillage networks and reaching out to wider society and policy makers in order to accelerate the transition to sustainable living.

(Global Ecovillage Network, 2014)

Many organizations—public, private, profit, and nonprofit—have been established to support eco-socio change globally. One particular entity, the Global Ecovillage Network (GEN), is an internationally recognized and respected NGO that is working with the United Nations to educate, share knowledge, and increase sustainability across all regions of the globe.

GEN works on a global scale in partnership with the United Nations Development Programs (UNDP) organization. The UNDP was established in 1966 with a mission to focus on helping countries build and share solutions in four main areas:

- Poverty Reduction and Achievement of the Millennium Development Goals
- Democratic Governance
- Crisis Prevention and Recovery
- Environment and Energy for Sustainable Development (UNDP, 2011)

UNDP and the UNDPI (United Nations Department of Public Information) serve to "partner with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone" (UNDPI, 2014).

They are working with the Royal Thai Government and local NGOs to create new programs that are focused on energy conservation programs, promote renewable energy initiatives, preserve the environment, and improve water resource management systems. UNDP, in conjunction with the United Nations Environment Program (UNEP, 2015), introduced the Poverty-Environment Initiative in Thailand, a program to increase creation and management of national development plans and environmental policies.

Leaders of this initiative are preparing for the global change by putting the power back in the hands of the people and empowering local governments in the planning, budgeting, and decision-making related to environmental management. National laws and regulations are being put in place to support environmental governance, yet there is a movement to decentralize environmental decision-making by moving this to local communities to govern.

GEN established a regional partnership with Ecovillage Transition Asia (ETA), established in Thailand in 2013. ETA committed to help promote and deliver the adoption of ecovillages in Association of Southeast Asian Nations (ASEAN) that started as a small idea thirty years ago. Today, ETA is part of the critical mission to secure vitality and sustainability for the people, the village societies and the sovereign nations of ASEAN, with a vision to "imagine a

conscientious, empowered and spiritually-rooted Asian society, with its redesigned rural and urban habitats thriving in harmony with nature and in happiness" (GEN, 2014).

"We partnered with organizations to learn and teach about this for many years. Now, don't want to teach it anymore, we want to implement it. This model is a very good fit for our economy and small town structures where there is no need for the big markets. A community market can sustain the people. You can talk to the grower when you are buying local products. You can talk to individuals who are focused on the healthy cultivation of food and the organic farm. The agriculture is used to sustain the local population and then anything extra can be exported to large cities, like Bangkok or Tokyo. These actions can prevent socioeconomic destruction in this region. That will be the best." (Sponsor, 2013)

In December, 2012, one of the major sponsors of the ecovillage mission in Thailand was invited to attend a meeting with country leaders for the national strategic planning for Chiang Mai. Shortly following this meeting, the On Tai Ecovillage became part of the national plan for Thailand. On Tai and the surrounding land area are highly regarded for their beauty and sacred space. Preserving this in every way is essential to the project. It is a very important development project with the highest visibility and progress is followed by the King of Thailand himself. Planning is intense to ensure that a holistic approach is taken to develop a town and a city, and to include all perspectives.

The project requires continual review by the local stakeholders and includes government stakeholders to maintain a careful balance. The ETA applies their expert-level business consultancy and competency of the practice leaders from the Institute of Management Consultants Association of Thailand (IMCT), an exclusive global network of management consultants and partners. Their consultancy, combined with the spiritual leadership and eco-social advocacy of a former Buddhist monk, author, and thought leader, has integrated their joint vision, mission, and core values to advance this new charter.

In addition to their standard advisory services, the IMCT works with the ETA to bring "a balance to business and society" through combined economic, socio-ecological expertise, and a rich cultural-spiritual approach. The ETA provides stakeholder commitment through ongoing consultancy engagement and making connections to expert networks to help the traditional villages preserve their culture and spiritual traditions and self-govern, while incorporating

holistic science and technology that supports their sustainability through a more ecological and resilient living environment for the village.

> Ecovillage Transition Asia
>
> The goal of the ETA is to promote a transition to redesigned rural and urban environments, coexisting with nature harmoniously, that will lead to a more conscientious, empowered and spiritually rooted Asian society. In this way, we are doing our part to help Asian society advance into the future in a way that is sustainable, ethical and ultimately beneficial for all. We do this by encouraging the adoption of, and providing consulting and training for, forward thinking policies including renewable energy, green architecture, food security, IT access and sustainable economic practices.
>
> (Ecovillage Transition Asia, 2013)

Ecovillages embrace objectives similar to those of smart cities: sustainability and efficiency of community. Ecovillages include carefully creating a master plan with local government and citizen participation. Cooperative and cohesive projects encourage all in the community to participate in improving the infrastructure, developing frameworks and guidelines for economic, ecological/environmental, educational, social, and cultural dimensions.

Projects are inclusive for the community to create best practices of ecological architecture, environmental technology, renewable energy projects, health care integrated frameworks, food supplies, community planning, and often eco-tourism as a means to develop economically. Building stronger community and connection and keeping a focus on decentralizing networks at a national level is important part of the change. Improving the ability for citizens to take responsibility for sustainable living and learning toward increasing local participation is a goal of the ecovillage projects.

The ETA's approach is to provide well-formed grassroots support for smart villages within the existing community. In Thailand, these locally driven initiatives toward sustainable living are an alternative to mass migration to big cities. In an emerging market such as Thailand, where the country is experiencing high-growth at a large scale and much of the infrastructure is looking at rapid scalability, ecovillage projects provide a means to preserve the provinces and allow the people to work and thrive in their villages without having to move to the city to make a living and support a family.

People who are engaged and involved as local stakeholders exercise their commitment with ownership and responsibility in community decision-making policy creation feel empowered to take action and have a higher level of satisfaction in life (Heinberg, 2010). In Thailand, this means that villages can be preserved rather than lost and replaced by big city infrastructure.

On Tai is in the process of transitioning from a traditional village. ETA worked closely with the "owners" of the plan, the local people of a dozen smaller local villages and approximately 4500 people. The team incorporated the Four Keys of Sustainable Development, See Figure 4.3 and 4.4, as guidelines applied on the project from their enablement partner, Gaia Education: Economic, Ecological, Social, and Worldview (Gaia Education, 2012).

Figure 4.3 Gaia Education's Four Keys of Sustainable Development

SOCIAL	WORLDVIEW	ECONOMIC	ECOLOGICAL
Build Community and Embracing Diversity	Holistic Worldview	Shifting the Global Economy to Sustainability	Green Building and Retrofitting
Communication, Facilitation, and Conflict Resolution	Listening to, and Reconnecting with Nature	Right Livelihood	Local Food
Personal Empowerment and Leadership	Awakening and Transformation of Consciousness	Local Economics	Appropriate Technology: Water
Celebrating Life: Creativity and Art	Personal Health and Planetary Health	Community Banks and Currencies	Appropriate Technology: Energy
Local, Bio-regional, and Global Outreach	Socially Engaged Spirituality	Legal and Financial Issues	Whole System Approach to Ecological Design

Figure 4.4 Gaia Education's list of four keys to Sustainability used to plan and build ecovillages

In addition, to adapt the model to a better fit for regional application of ecovillage development, the ETA created a localized plan that provides the structure of the master plan for transition of villages to ecovillages. There are 11 core steps in the plan, depicted as an interlocking circle, see Figure 4.5.

Strategy and theoretical conceptualization advancing to execution planning and implementation was not easy. The ETA consultants applied their methodology of Thinking, Planning, and Execution (TPE) when the concept of creating a successful ecovillage at On Tai became an actuality and a master plan was created with and for the people of the village.

After the master plan was created, many stakeholders became important to the successful implementation of the project. Although it will take ten years to finish the whole town, the team has started on water and energy solutions and will continue to advance in the right direction. The team is in unanimous agreement that they are committed for the long-term and will take

one step at a time and keep moving forward each step toward making the whole village function to the master plan with regard for all of the sustainability keys along the way.

Figure 4.5. ETA's 11-step transition process from village to ecovillage model as depicted in the On Tai Community Master Plan (ETA, 2013)

The 11 steps in the transition process from villages to ecovillage model are: ecology, good governance and social justice, economic and agriculture, appropriate technology, education, disaster and water management, eco-tourism, culture, land use, health, and spirituality.

Young consultants who are working in the ETA are encouraged to share ideas that drive innovation. In return, they increase their experience in implementation by contributing to the execution of the On Tai Ecovillage project. As they become stronger practitioners in consulting, they will gain confidence to drive new ideas through the process of theory, planning, and execution. By committing they increase their leadership and adaptability to

change and increases their expertise in methodologies and new technologies, depending on the nature of the project.

To gain support for On Tai, the leadership team core group of consultants and local experts sought major support from other stakeholders that included investors, local leaders, and government representatives. They spoke with local leaders to gather all the ideas by applying research methods of participatory action research (PAR) methodologies. After the information was gathered, they had relevant content to follow their model of conceive, believe, and execute.

A large core team of 8 - 10 people and an extended team of approximately 30 people are working full-time on this project. An important first step was to connect their effort with the government. They have policies that must be followed and implemented, so the government is an important partner and key stakeholder to the success of the project. It took many meetings to determine how to work together on the project. It also meant investigating and knowing what rules the government employees need to follow. The team found many instances when the political people were introducing possibly corrupt practices. The ETA team had to be very careful to work and negotiate toward a favorable outcome so that they could continue to make progress and not lose ground due to unfavorable political problems that could delay or kill the project.

They were able to build a dialogue and explained each time that they knew the rules that the politicians and city workers were supposed to follow, and if they still needed to be corrupt then OK, but the team was aware that policy corrupts or the money corrupts them. The team emphasized that they have to do good things for the people or when the people have a chance to change the situation, the corrupt politician will not get the vote.

In Thailand, there is an effort to change corruption in the government by exposing it and reminding people that they cannot do bad things and still get the vote. It is changing, and the first place to seed the change is in the local villages where the people can change the way things are done and get happy voters who will give them the vote. These are families that have had these types of jobs for hundreds of years and these are old habits that need to change. Local politics needs to lead the change and cultivate more social happiness with the local people. If they do not, the good people who will help them to stay leaders will leave. This provided a learning opportunity for all parties, with no one party trying to be better than the other, but uniting toward a common greater good.

All levels of new knowledge and broad education are good and provide opportunity. Excellent sources of education are available and helping propel Thailand forward in the economy, but there is a ‘brain drain’ of educated and skilled labor when residents of rural areas move to the city for work and for better opportunities. This trend to migrate toward city living is causing overpopulation in Bangkok and major cities while the villages are left underserved.

This program to transition villages to ecovillages provides an opportunity for the educated to stay and help develop the village, where they have a stake in leading it and working there themselves. Professionals are encouraged to return to their rural villages and bring their expertise. Students will not have to leave home and move to the city to get an education and earn a living. They can be part of creating a stronger economy for their village.

It was important to the team to identify early where to get investors. Bankers would not invest. They are not businessmen because they are interested only in proven business, where their money is less of a risk and more secure to return the investment. Investors need to be in a position to make their money, so they had to see a business plan that could demonstrate the return on their investment.

The team of consultants reviewed the potential investors to pursue and decided that the best source for this would be future suppliers to the ecovillage systems. The proposal defined how investors, as stakeholders, would own parts of the supply chain created for the ecovillage and make their money back at the same time they were contributing to the vitality of the ecovillage and helping the local people improve their lives. It is a win-win proposition for all if funding is committed by stakeholders and returned as revenue and profit that can be used to support the project while improving the long-term vibrancy of the village.

At On Tai, investors would make their money back in a power plant. The IMCT has partnerships in the energy sector and partnered with these businesses to define a project. The process would be to work out the plan for On Tai as the first-of-its-kind project. From this outcome, they would then create a repeatable process, identify the next opportunity, and keep the education, implementation, and revitalization of the villages toward sustainability moving forward.

The logic and economic principles of establishing this particular project are in line with a key economic evolution taking place in Thailand. Solar is big business today. There is a great deal of this natural resource, the sun, shining on Thailand, and the country can make a positive

difference by decreasing their dependence on traditional energy sources and supporting renewable energy initiatives.

Solar is clean energy and it provides an opportunity to invest in the “green movement” for the betterment of the nation. Solar power plants previously cost too much to build and were not worth the investment, but the price of a megawatt has gone from 5 million dollars to 1.5 million dollars. The drop in prices has had a positive impact economically and ecologically for the new self-sustaining smart cities and villages being built across Asia.

Energy technology and the supply chain processes are very expensive and the owners of the power plants would have all the money if the village built a dependency on an old model. The people in the middle and lower ends of the economy would be squeezed.

Applying their business expertise and savvy, the consultants identified a good entry point for the On Tai Ecovillage to benefit from this change to integrate energy production into their economic model. It was critical to look at the process of integration. If one link in the operation is weak, it can ruin everything. One needs to be in a unique position to focus on the right point of entry in the supply chain.

Investors, as stakeholders brought financial commitment and built a power plant in Thailand. They found the right solution for the location and could justify building a cooperative investment project that meets the needs of all stakeholders.

Global thinking is important, but local acting is essential. Local experts are partnered with global experts to make sure that the plan suits the requirements of the village. The design in the ecovillage is to use the roof for the solar panels so that the land can be used for agriculture-food and living space for the people and animals. This also keeps the dust from blowing on the panels in the wind. The local experts know their specific needs and provided the knowledge that the dust blows up to three meters, so if the solar is planned for higher than four meters, there will be no problem. The architecture allows optimal use of the land for locals who can create farms. Above, there is a productive, revenue-generating solar farm; below, there is a greenhouse for local business and dwelling.

The team knows that openly sharing the co-creation and implementation of the plan secures a stronger commitment from all stakeholders who want to stay actively involved. The partnership and trust gets stronger, as is evidenced through fellowship and behavior. Recently, when the ETA planning team set up a meeting in On Tai, the local villagers showed a sense of pride and participation by making the most elaborate local food dishes and sharing these at mealtime

with the planning team. The ecovillage leadership team was reciprocated in kind and together they showed commitment and engagement with the local families. The ETA is creating a source of business, though this is not a primary objective, while developing successful future plans for the village to thrive as a result of ownership and self-governance.

Another specific project is water management. The water in the region is mismanaged and there is a good deal of waste. When the correct phase of the project is ready, the consultants, as stakeholders, will bring in experienced international resources (Dutch) to help develop new water systems and processes. The water management system will be developed to support the village's solar, wind, and hydro infrastructures. The technology and investors will not hold the power and manage the people. It is installed there to support the model and the goals of the village. Again, it will be managed and maintained by the people.

A strong spiritual element permeates the culture and people of Thailand and plays a critical role in all aspects of the ecovillage planning and implementation. The On Tai leadership team lives by the philosophy that all things are part of mind and body, connecting through the brahma. When one thinks of the good of a smart city or ecovillage, the talk will come from the conscious while the subconscious controls many other parts. Subconscious is much more powerful. The physical body is hardware; the subconscious is software. One must always be aware and acting on this knowledge to claim the power to help get good people and investors, and be successful on the ecovillage project. It is all because of good conscious and subconscious–both help professional and personal success. "One must act to bring something good to happen in your life and the life of others" is the inspiration offered by the leader of the project.

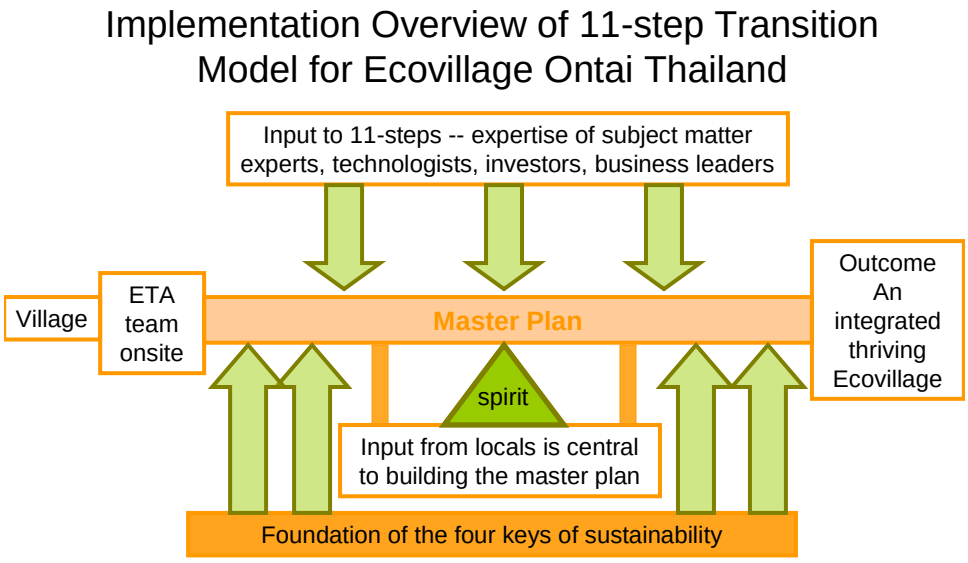


Figure 4.6 Implementation overview of 11-step transition model for Ecovillage On Tai Thailand

The plan, as shared, is to create On Tai and a few more villages by copying this model and, when the timing is right, applying it as a general plan that can be reviewed and updated or customized for each village, see Figure 4.6. There are 7000 villages in Thailand, and the plan is to build a team of consultants and specialists from around the world to deliver an ecovillage for all of the people. Top consultants can design and architect and provide specialized services and the local people (Levine, 1988) can be employed to build and maintain over the long-term. This is applying global thinking and local acting to the four keys of sustainability.

Because of the team's successful delivery of milestone results to date, they received a recent request from the Thai government to build another smart Ecocity, which would be a larger entity than an ecovillage, built on the same principles, to accommodate the projected growth of Thailand with so many new people coming from the northern routes. The ETA is set up purposely as a nonprofit project so that it can focus on producing strong return on results and not be driven to focus only on bottom line revenue and excessive profit. A project team member shared, "When you act for the good, success comes to find you."

Chapter 5. Findings

In this chapter, I present the findings of my action research that explored the role of stakeholder commitment in smart cities case studies.

The in-depth interviews and the situations the participants described when really tough decisions had to be made on the projects revealed opportunity in crisis and change. Equally valuable was the approach to incorporate technology and innovation to support change. Leadership characteristics were observed as a key element in stakeholder commitment to smart cities in every case. The data gathered, coded, and interpreted uncovered key themes when aggregated across cases and incorporated with other empirical evidence. The findings of all cases combined provided evidence to improve quality and commitment to success of future smart cities, urban village and ecovillage projects individually or when developing strategic synergies and partnerships.

These case studies have themes that uncover more similarities than differences with regard to stakeholder commitment on these very different projects. While there were differences that included geographic and regional settings, cultural differences, sustainability prioritization, leadership characteristics, and management approaches to change, there were common goals and stories of sustainable practice to bring the stakeholders through project progression. One major and significant difference that extended from the core of the project outward to the infrastructure and approach to solving problems was the scope and scale of these projects differ greatly. Both land mass and population impacted varied greatly and therewith the scale of the solutions and quantity of stakeholders. Many of these differences were exhibited as diversity in action and provided some universality in the similarity of the effects of change on a project (Lewin, 1947).

IBM Smart Cities are designed to support the growth of major new cities (IBM, 2012) and the retrofit of existing large cities expanding to accommodate the migration of the masses to cities. The city infrastructure focuses on efficiencies and productivity to provide the core city operations resources with the ability to act and make informed decisions based on the intelligence gained from the diverse data captured for the city. San José scopes the work in phased efforts supported by a vision with defined goals and objectives that includes the residents in the actions to drive attainment of those goals. The ecovillage is focused on creating a master plan by and for the villagers to build integrated efficiencies on their current land space that encourage autonomy in a smaller, more manageable scale.

The starting point for all of the projects was strongly influenced by similar economic and viability factors (Daly 2013; Destatte, 2010; Golob et al., 2014), although during the interviews it was clear that the additional factors of eco-social, cultural, spiritual, and others influenced the decision-making process differently depending on the visions and motivations of the project leadership team. While the projects must be economically based to survive, the incorporation of a sustainable framework (Golusin et al., 2014) was of importance to all projects.

Key Themes and Discussion

Synthesis of my research findings particular to individual stakeholders and organizations of stakeholders in these cases uncovered strong ties between my research findings and the literature review key themes related to the role of stakeholder commitment, as illustrated in Figure 5.1.

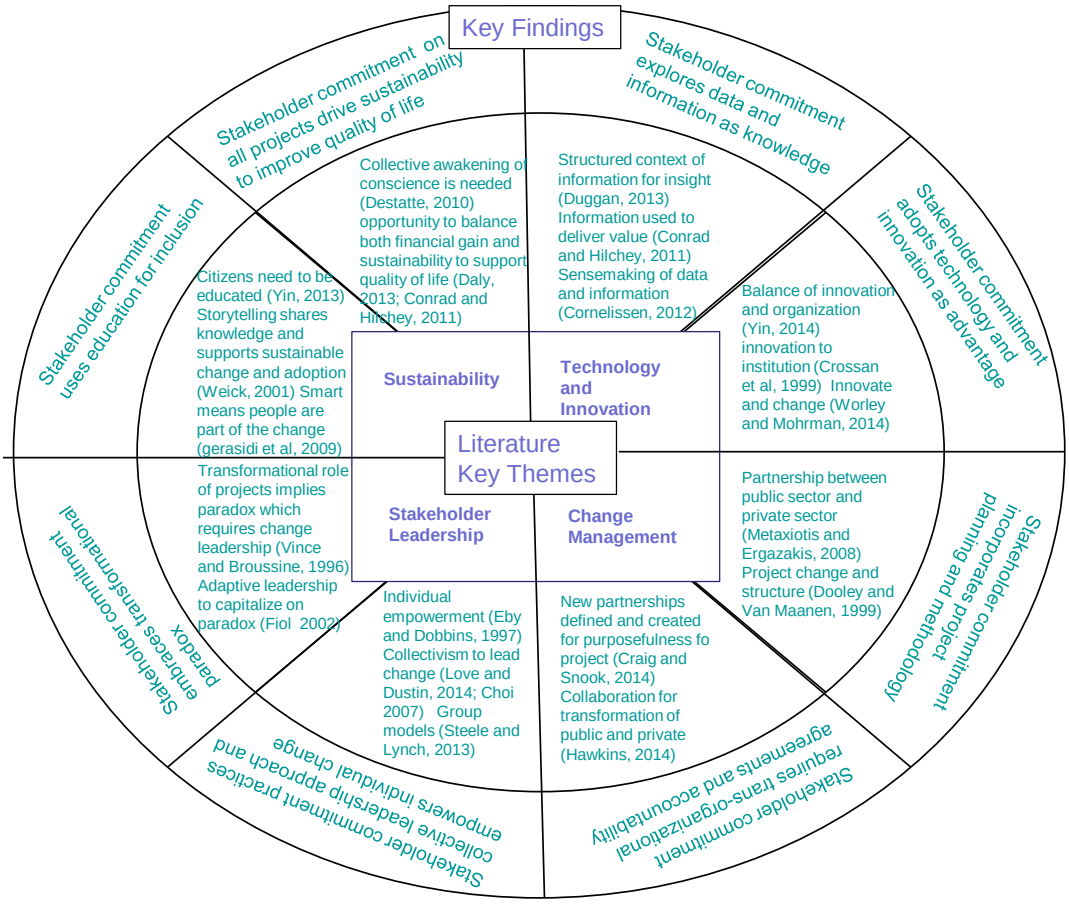


Figure 5.1 Highlight of ties between key findings and literature review

The following section discusses key themes (Eisenhardt and Gaebner, 2007) identified in the research that can be attributed to the role of stakeholder commitment in the smart cities case studies.

The role of stakeholder commitment endures across multiple facets of smart cities projects. Stakeholder commitment:

- Explores data and information as knowledge
- Adopts technology and innovation as advantage
- Incorporates project planning and methodology
- Requires trans-organizational agreement and accountability
- Practices collective leadership approach and empowers individual change agency

- Embraces transformational paradox
- Uses education for inclusion
- Drives sustainability to improve quality of life

Stakeholder Commitment Explores Data and Information as Knowledge

The cost of data is cheaper as the cost of computers, systems storage, and data collection software is commoditized. Economies of scale and costs are beneficial to the city when implementing a project of the scale of IBM Smart Cities, where data collection and analysis in real-time are critical for reliable and valuable insights toward decision support and adaptive change (Dooley, 1997) in that environment.

However, there was a conflict with just having data but not knowing how to use it as information. The explosion of data creation is not always a good thing unless one knows how to use the data. 80 percent of data is unstructured. The unstructured data needs to be converted to be structured enough in context to provide insight (Duggan, 2013). Interviewees shared similar hesitancies about data, whether their projects were built on the foundation of a data center or whether it was not in their current plans. The common theme was to question the use of citizen data as the new sociological approach to study everyday life based on the data collected (Kalekin-Fishman, 2013). They were not confident that more data is good data and were not sure what data could be useful in their change models (Paraskevas, 2006) For example:

- A project CIO shared, “There are so many sources of data, but is there really a need to collect it all? If not, what sources should be collected and used?”
- IBM Smart Cities’ technical leader explained the problem many client teams have on projects, “What data is valuable and, more importantly, what data is not valuable. How do we know what data to ignore as ‘noise’ that should not be collected because it adds no value?”
- An interview with an ecovillage technical project manager, “When we collect the data, what do we need to do to it to get the value from it? Do we even need to use all of it?”
- The CIO ended with a conclusion that data resources spend money that can be used elsewhere if it is just going to be analyzed but then budget falls short of being able to act on the findings the data produces, “The resources are expensive to spend on analyzing the data instead of acting on it.”

Data is not always better if it is not secure or if no one knows what to do with it. Too much data can leave a city government exposed and facing security risks if the data is tampered with or there is a breach of privacy in the systems where the data resides (Sklansky, 2014). Too much data also means that someone has to administrate the data and prepare and organize it for the different levels of users who may need authorization and access. “We may collect a mass amount of data, but it might be overload to us and instead of helping it could actually restrict our progress.”

In San José, the team uses the data to identify projects, track progress, and define new plans for more advanced smart city initiatives. The IBM Smart Cities health services project was built on the foundation of the data and its analytical value applied to the industry solution delivered. The use of real-time data will make sense to them when the data is *open while secure* for them (Purdam, 2014) to use themselves. “We establish some baselines, look at what is available, and look at how we use the data. Can it show us the next steps?” was shared by a city council member with reference to applying data insights on key initiatives.

In smaller villages, gathering the right data is necessary and relevant to determine the strategy and implementation while retaining the authenticity of living in the village and allowing its transition into a more eco-sustainable community.

If the data is available, the analyst and decision-makers can find themselves wondering what criteria to define to determine usefulness and identify issues that might require action. The team can get lost in ‘analysis paralysis’ and not act or they can create a larger issue if they have invested in the technology and the decision support system does not perform as intended and fails the users, residents, and other stakeholders who have an expectation that the information will deliver value (Conrad and Hilchey, 2011).

A technology project manager shared his view, “Sensors have been around forever, we all know we can get more data.” Now, the price of sensors is so inexpensive that they can be everywhere. But do they need to be, and does it make an area smarter or just more connected? More frequent data, more structure in the data, but what is the applicability of the data? How should it work with other data? The data may be cheap, but the cost of then having to analyze and do something with it is expensive. All the case projects discussed data and information as questions requiring further investigation.

Participants noted that they are exposed to an enormous amount of information about big data solutions for smart cities and city planning, and there is pressure to move in that direction. One

council member participant shared that her approach to her city planning work with others was ‘outdated’ although it was a fairly recent IT solution. There is more than an influence to jump in; it is a peer pressure atmosphere that pushes the cities to ‘be part of the current information systems hype’ to create infrastructure for big data analysis. Advice is that the information they have now is not enough to run the city and they need to collect data in real time. This was “recommended often,” though the majority of the participants shared that they are not ready for the real-time analysis of the data. Some do not see this as a need for their environment and most cannot spend money on this capability at this time. The examples shared for smart cities are not compelling to the smaller entities that have real-time problems on the street that they already know about but do not have resources to resolve. They need to “fix the obvious problems first, what we know is broken before getting more data to tell us everything else that is broken.” One participant who has a responsibility for IT for a city shared, “This is where there is dissatisfaction. I don’t need analytics to predict how to fix this problem.”

The participants interviewed felt that they had the data they needed for related situations. They did not want to collect data if it didn’t matter or if they would have no use for it. They felt that maintaining too much data would be an added cost and a burden. Security issues could arise as well. If they had data that was not useful for them but it got into the wrong hands, it could create more harm than help. However, the interviewees unanimously shared that having good data and analysis that could be a fit to solving a defined problem was key to future advantage.

So, with each project, they review exactly what data they need collect, how it will be used, and how it will be secured. They also decide who will have limited access and will grant authority only for specific applications and use. Technology makes a contribution in asset management and data analysis to support immediate and informed decision-making. “There is a good deal of modeling and mapping to support the advantage gained by using the insights derived from the information gathered in a city environment”, offered the CIO.

This allows cities of large scale to be more effective and efficient in large-scale management scenarios where unilateral decision-making is supported by evidence-based insights. This is the way that technology is applied to make a city smarter in large scale. Data is used to understand the actions of many and to scale to support large populations, to see patterns and trends in the data that will help them make decisions and use the assets available in the city more effectively. Just as useful in smaller scale is the ability to use the data that is available and deemed useful to help make decisions in a smaller-scale environment directed by the needs defined by the community.

Each case had to determine when data was an asset or a distraction to their project. Data quantity, quality, and availability were a source of satisfaction, dissatisfaction, and confusion, depending on specific situations in the case. Relevant data available to the project leaders was identified as a source of useful information that was used to deliver business value. Part of their processes included a resistance to change (Piderit, 2000; Hamel and Prahalad, 1991) until they could understand and apply the data, a form of sensemaking (Cornelissen, 2012; Weick, 2001), in the correct environment and context needed to help solve their problem.

Stakeholder Commitment Adopts Technology and Innovation as Advantage

Each case incorporated a balance of innovation and organization (Yin, 2014) change that allowed for the transformation required in the smart cities, urban villages, and ecovillage projects.

Innovation is emergent throughout the life cycle of the projects. Innovation is driven from project participant intuition to group institution via framing on the project (Crossan et al, 1999). In technological applications people are discovering new event driven paradigms (Cretu, 2012), organizational models and methods (Gergen, 1992). Innovative approaches are being presented by NGOs, public and private entities finding new ways to create and fund public-private projects and encourage meaningful citizen engagement (Powell and Colin, 2008), including how to apply science, data, and technology to support sustainability regardless of organization size.

One CIO shared, “Whether it is in a major city or an ancient fishing village where our parents and their parents lived, we can see that things are still happening the same way. Yes, they may have introduced a fancy Internet café inside a coffee shop or village hut, but life, relationships, and problems are related to the same basic needs.”

The project teams showed how closely they are working to address these needs by incorporating a collective orientation toward sustainable solutions for the betterment of all citizens (Choi, 2007). Energy has always been a sourced need. The compelling current issues are about how we generate and use energy without depleting the potential for future generations. The electricity grid and reducing consumption are issues, but the basic need for energy is the same. The power goes out and it is a major problem because hospitals, businesses, schools, and homes need it to operate.

Water management is also an issue. People have always needed the resource and built wells for water. Now we need to be concerned with how much water we waste, for example, while we are waiting for warm water to come into our house pipes. Sustainability needs a new, fancy system to save that first water while we wait for the warm water. But saving and conserving water has always been an issue in the villages. The basic need is the same with the related problems that are a result of human progress. Scientists are looking into ancient systems to study water conservation options that we can insert back into the plumbing processes today.

Crime is skyrocketing regardless of the location, and is costly and expensive to a city because revenues are lost when businesses and residents leave the city. An IT system can identify where the crimes are taking place, but the real issue is that there are very few police officers to send out to answer calls or patrol an area. A crisis is looming because cities are having trouble retaining officers and recruiting new ones. The problem for citizens is that quality of life issues are growing because of the increase in mid-tier and dangerous crimes. Safety is the basic need to be addressed. The answer is not necessarily to implement a new IT system to show where the crimes are taking place.

The interesting aspect in these case studies is determining how the issues can be addressed for now and for the future. Those who came before us figured out much of this before we expanded consumption. We have a great deal to learn from looking at the classics and learning from the old ways. It takes technology to think back to our rural roots.

Cities examine major problems and plan their technology for areas where it can offer the most benefit today, and many have the advantage to determine where it can offer competitive advantage in the future. Ecovillages need to have enough technology to develop and drive business, but they do not want to be overridden by too much technology and the complexity that comes with it. But without it, they would become obsolete and be forced to migrate to the cities. They plan their needs and then seek out the specific technology to help augment and simplify the execution of their sustainability processes.

In a remote village in Thailand, the planning team ran into challenges where access to electricity sources was limited. Where access was available, it was not always reliable. To improve the economic potential in the region and support a sustainable solution, a stable and reliable solution was needed. Part of their solution was to innovate and change (Worley and Mohrman, 2014) their economic and ecological approach to the situation. They introduced new solar technology to help alleviate current problems and support achievement of new goals.

At the other end of the spectrum, in an advanced smart city such as San José, the latest in automotive technology is introduced to drive longer on superhighways. Adoption of the eco-friendly, high-end Tesla electric car is growing because of its sustainability, its friendly impact contribution to lower carbon emissions and battle the pollution problem in cities. It is actually increasing the demand for power consumption and a new problem is the need for special charging stations to be built everywhere.

The IBM Smart Cities health services solution would use powerful technology to link multiple entities to collaborate on better health care delivery solutions. Without the advanced technology planned for the project, they could not accommodate the complexity and high-performance required to integrate the many existing sources of information and provide new easy-to-use point-of-access devices.

The application and inclusion of technology needs to be meaningful in the right environment for the situation. The right balance must be determined by the stakeholders engaged to manage the variables whether adapting, evolving, or making revolutionary changes (Schein, 1985).

The observation is made that in sustainability, scaling of innovation is seen as it is also seen in business practice. It is the practice of venture capitalists to invest in innovation that can grow in massive scale and therewith ensure that their return on investment is larger than small-scale innovation and smaller return on investment. Large companies and cities get the money for innovation from existing networks and their larger requests for funding can be secured with a phone call. It is no surprise that funding for water pumps for cities versus water wells for villages is potentially more lucrative so it is easier and quicker to secure investments. Investment funds innovation.

Scaling innovation up for cities and down for ecovillages does not mean there is a more “correct way to invest.” It just means that money usually follows large scaling opportunities and ecovillages see less funding from large, economically minded sources. However, innovative funding is gaining acceptance from more eco-social focused investors. Micro-loans and Internet crowd-funding are sources for small-scale innovation that can make a big difference in the world.

This is changing the way innovation has been supported historically because of economic considerations. Now, investors have a route to also invest for sustainability. Analysts and Wall Street are not yet not aligned with this change, so it will be challenging for corporate

stakeholders (Hahn et al., 2014) to look beyond the measures of the financial world and stay committed to the change for partial ROI to be measured in sustainability for smart cities and ecovillage projects.

Investment and return criteria need to change from immediate, short-term financial returns as the sustainability factors gain importance in project strategies. A financial outlook for growth is not a bad thing and is not discouraged. Rather, it is just an adjustment of the timeframe of the financial return. Priority and policy will ensure that the financial investment is sound and the gains are made, but it is how to prioritize that to align with the attainment of the sustainability goals as well. It has always been the case that the big innovators are taking the risk and making the big leap to get things fixed. They are also the key stakeholders who need to look beyond current measures of financial success and include other additional value assessments and returns in their vision.

In addition to innovative financing, blending public and private sources of funding can create conflict in stakeholder management. There may be no expectation of return when funds are provided through established grants, but high expectation for return and gain from potential venture capital investors. This needs to be addressed in project planning and schedules to forecast the outlook for each source of funding and their expected results.

Technology has influenced human behavior and delivered a sense of entitlement for instant gratification and satisfaction, but we need to return to the principles that were in place before the age of industry and technology sped up the world view of everything for short-term gain. Sustainability is the key and it is seen in sustainable energy – we are running out of all the other resources. Innovation means that we need to change the way we approach the applicability of technology. We have today to change future innovations, which have to be more sustainable inventions and innovations.

Though technology is cheap and consumers can demand instant goods that are customized to their needs, the elevation of the collective collaboration needs to stabilize the rapid development of technology. Although we might have individual devices, the data and information we receive as knowledge needs to come from a collective and collaborative source. Collective means innovate new tech for sustainability and shared purposes (Craig and Snook, 2014). We must change the way we look at data and we must have stakeholders who are committed to managing the change.

Consumerism has nested in many ways in that people want everything instantly and to suit their customized requirements, but this is not sustainable. At our current pace, we are moving toward the rapid destruction of the environment and our planet. As with stakeholder goals, single source satisfaction of *me* needs to move toward collective consciousness of *us* and the well-being of all.

There is value to be gained from the way we use all the data that we have access to in smart cities environments (Purdam, 2014; Powell and Colin, 2008). Data insights can lead to innovation and the creation of collective technology for sustainability. Stakeholders must be committed to managing change as part of the innovation and technology process, understanding it is constant (Tsoukas and Chia, 2002; Dooley and Van de Ven, 1999). Sharing the knowledge with the larger population through sensemaking (Cornelissen, 2012; Weick, 1999) and facilitating adaptability is critical at every level. Communication and outreach is critical as emotions and paradoxes can (Vince and Broussine, 1996) impact progress (Craig and Snook, 2014). To get to transformation, stakeholders are essential to interlock on moving from ideas to creation and socializing the value of the change underway for acceptance by the larger population.

In the full spectrum, whether smart cities or ecovillages, there is data available. Although each site may look at the data differently, they can each find new insight by bringing more sources of data together. The data has been there all along, just not captured and used for any specific purpose. Now, they can look at it in different ways and determine how to aggregate the data for more meaningful outcomes.

Making decisions based on the data insights allows an increase the level of self-governance of the community and affords the residents the ability to stay where they were raised. While growth and migratory patterns will continue in many regions, the ecovillage residents will not have to migrate to cities for a livelihood because they will have planned and created a community where they are able to thrive, work, and live locally.

Stakeholder Commitment Incorporates Project Planning and Methodology

The ‘right’ people need to be assigned to lead and participate on a team of leaders (Caldwell, 2003) who divide and conquer the project management responsibilities on these complex projects. The strategic and tactical success of any of these projects depends on having the right people with project management skills as stakeholders to manage the process. The leaders have to bring the correct skill set, including process, flexibility and a commitment to

jump in (Brockner and James, 2008) and take control of a situation, collaborate, or delegate control to the correct resource.

The resources in each of the case studies had diverse roles and responsibilities, depending on the requirements of the project. Even the origin of the project defined who held a key leadership role. Collaboration was required to secure the two-way partnership between government and private sector team members (Metaxiotis and Ergazakis, 2008). On the IBM Smart Cities project, the IBM team carried a major portion of the control, though their success was strongly dependent on the other stakeholders. In San José, the control and dependency is intermingled across internal vision and goal owners and related implementation teams. In the On Tai ecovillage project, the core team was led by a chief consultant, philanthropist, and business leader, though it was clear that they looked to the local leaders to onboard quickly and have an equal stake in the success of the project.

Highly skilled technical people, project managers, and even extended investors played a role in leading the change. There was a key variation in who held key positions and control points in each of the cases. There were those that led with economics as their primary perspective, and others who led with a more eco-social emphasis. Leadership, ownership, and commitment in the form of oversight and stakeholder management (Worley and Mohrman, 2014) of the project objectives were critical in each case.

Planning requires the careful consideration of incorporating the needs of the people, place, and processes that must be followed. Tied to each of these cases is a need to plan and work within existing boundaries. Governments have policies that must be abided by and often it is more complex for existing systems that are in place rather than new systems to avoid risk to the current environment and people's livelihoods.

New cities can do it differently. They are starting with new space and can build from there. The residents moving into the new city do not have an earlier experience to compare this with. Everything is new: planning, building, technology, and solutions. They can build plans from the bottom up. For example, new cities can put in fiber optic easily.

In existing cities and villages, planning is extensive to retrofit and add new solutions that replace the old ones. Managing this level of complex change is more challenging and emotions and paradox found on these projects influences the change process and success of the projects (Vince and Broussine, 1996). It takes much more work and planning, including engaging the current residents and local experts to be involved. Jobs, livelihoods, and

neighborhoods are impacted and there is more chaotic change related to these projects than to new structures (Van Maanen, 1995). The same solution requires digging up existing city streets or disturbing what might be vital village ecosystems to put lines in the ground. Merging multiple physical systems and existing IT solutions as planned for the IBM project requires expert systems integration planning. Specialist teams related to each part of the project are required to manage the change (Caldwell, 2003) and public involvement is critical (Gerasidi et al., 2009).

Each of these cases followed a master plan and a methodology for implementation. They each identified key owners, requirements, dependencies, and a timeline in outlined methodology and process that identified the key components and requirements.

Stakeholder Commitment Requires Trans-organizational Agreements and Accountability

Organizational development and organizational behavior fundamentals are critical for the blended organization that is responsible for project planning methodologies, education, and leadership. Organization (Baum and Rao, 2004; Beer and Walton, 1990) and the related skills delivered to solve the new problems in this new environ often require defining unique new performance metrics across virtual organizations and teams, and represent new areas of emerging management science innovation models.

Because of strict budgets, the organizational goal of governmental organizations is financially based. But the governments must achieve success by spending these funds on behalf of their citizens, whose taxpayer dollars generate the budget and whose satisfaction generates the votes for the elected officials and related staff.

Currently, organizational goals are tied to short-term budgets and achievements. Smart cities need to have a longer-term approach, so the goals of the organization have to change. They need to put more emphasis on long-term goals while maintaining their short-term measures of performance. Interactive control by management at all levels of the organization and continuous interaction and oversight (Simons 2013; Worley and Mohrman, 2014) is required to uphold agreements and track accountability.

Change leaders of the organization for smart cities need to be committed to developing others (Van Gorder, 2010), embracing the nuances of the environment and gaining influence of the people by practicing inclusion. The definition of the organization and its composition will be

dynamic (Tsoukas and Chia, 2002). Boundaries need to come down and a matrix structure that includes resources from multiple organizations needs to be rebuilt. The traditional organization of boundaries and separate entities driving separate goals is no longer functionally sound for a smart cities project. The approach must integrate all resources for the organization and needs to be a combined group of public- and private-sector leaders, managers, and specialists (Metaxiotis and Ergazakis, 2008; Caldwell, 2003) coming together to form a new organization that is defined and created for the purposefulness and meaningfulness of the project (Craig and Snook, 2014).

Stakeholders and the combination of applied resources must change and collaborate across the existing invisible walls built as limitations to contain control points within an organization. Though it may not be defined on any one financial entities payroll or organization chart, the combined resources for cities include those with the public-sector responsibility and those who commit from private companies to jointly form in partnership and manage across boundaries. This relies on the concept of leaders and teams who have no formal documented objectives that make them responsible to the “integrated organization” except for their connection of common goals and objectives and an integrated project approach for the attainment of those goals. Even as well-defined as the project may be on paper, the assumptions and dependencies of the team may be unstated and guided only by the sensemaking (Filstad, 2014; Weick, 2001) and coordination of individual and cooperative efforts for the common goal. In actuality, a stakeholder may have a primary goal that drives behavior for individual objectives but will need to balance that with the bigger picture of taking on stakeholder commitment for the larger goal.

Building project methods, rules of engagement, operations of change process, foundational technology architectures, and defined owner resources on standard project line items allow the strategic stakeholders to invest time resources and effort on the innovative, creative, and unique aspects of the project.

Assigned ownership and responsibilities must be shared by multiple organizations, city departments, agencies, and vendors and the implementation must be tracked across boundaries with accountability and responsibility for each expectation. Innovation and implementation must integrate collaboration between private industry and government for the people and by the people for transformational (Hawkins, 2014; Pearson, 2012) outcomes.

Stakeholder Commitment Practices Collective Leadership Approach and Empowers Individual Change Agency

Engaged stakeholders and transcendent leaders (Crossan et al, 2008) drive change. Stakeholder commitment is influenced by leadership style and a project's success is dependent on the most influential of the stakeholders leading with a collective approach to goal attainment (Monroe, Plate and Oxarart, 2013).

Isabella's (1990) theory that individual managers influence change as they interpret each situation was observed and validated in situations related to each of the cases studied. This flexibility and adaptability is a key trait of the role of stakeholder leaders adjusting to project responsibilities while upholding agreed upon commitments. Key stakeholders exercise their commitment in action by driving to strategic control measures while adapting and anticipating the change occurring to their environment (Pearce and Robinson, 2000).

Stakeholders should be prioritized for importance on each project and may play a different role in leading the transformational (Pearson, 2012) effort. This is supported by existing theory that states the importance of securing stakeholder commitment (Simon and Pauchant, 2000) to adapt and lead change (Brockner and James, 2008).

Instances of individualism, or individual performance, toward goal achievement (Steele and Lynch, 2013; March, Sproull and Tamuz, 1991) and toward goal construction was observed in each of the phases of my action research case studies.

Stakeholder engagement during my research cycles uncovered the need for collectivism to lead change (Love and Dustin, 2014; Choi, 2007) as documented in the results of surveys, focus groups, interviews, and the factors of sustainability and transformation models researched tied the themes of the conceptual frameworks together, as well. Application of collectivism in project management improved efficiency on all of the cases.

Gaia Trust (2012) observed an increase in citizenship behavior when individuals on the team were positive and higher on the collectivism factor. This was factored in and offered by several interviews on the ecovillage case. Behaviors of collectivism and inclusiveness were evident on the project.

In specific instances of effectiveness and productivity, individualism was referenced as a factor in expediting a task to completion, where collective goals were defined for the team. Some

cultures may map the objectives of the project or measure the success of the project based on individual attributes of key stakeholders and their assertive and strong biases or focus.

Individualism (Eby and Dobbins, 1997; Love and Dustin, 2014) in a society drives individual rights and independence, self-reliance, and self-initiative to change without waiting for the concerns of the larger community. IBM architects and specialists created a collective plan but clearly moved forward and acted with individualist approaches of self-reliance to achieve goals, and to ensure efficiency overall on project goals.

Collective cultures (Love and Dustin, 2014; Chiaburu, Lorinkova and Van Dyne, 2013) drive the project and measure success based on the community value and the benefit to the collective group (Wagner, 1995) where society as a whole is important, rules promote unity, everyone supports each other, and all is more important than the individual's needs.

American society is very individualistic and the establishment and advancement of the IBM Smart Cities solutions has roots in individualistic tradition. As seen in the Asia healthcare case study, the approach needs to be adjusted for collective group models (Steele and Lynch, 2013) when applying the solution and planning project deliverables in other cultures.

The stakeholder on these cases committed to being a part of the change for their own individual objectives and, at times, it was clear how they took responsibility as part stakeholder for the holistic and larger objectives that measure successful achievement of project goals across teams. It was important to weigh the motivations at all levels of the stakeholder owners leading the project and to align multiple commitments and priorities to a common goal. This was critical in discussions and checkpoints. Stakeholder leaders applied the benefits of sensemaking (Filstad, 2014) were used to present evidence that helped and improve the effectiveness and productivity of the organization toward the triple bottom line of success.

Leaders were prepared for change and created enough structure, routine, and open communication to generate organizational learning while allowing adjustment for each situation (Friedman, Lipshitz and Popper, 2005, 2000). They offered a sense of comfort that they could lead change while constantly assessing each situation and rethinking the assumptions (Tsoukas and Chia, 2002) as individual stakeholders who may have a unique goal and as part of a team with a common goal. This was demonstrated in the process of transformation in action when stakeholder commitment included leading change as routine (Caldwell, 2003).

Urban planning cannot only be to accommodate growth and capacity but to ensure that the value and quality of lifestyle remains high and that better insights into the data and information allows for improvement of quality of life issues. The stakeholders had to continually construct, evaluate, take action, and determine results and actions. My cycles of action research mirrored cycles of change in smart cities. Both quantitative and qualitative factors were essential to evaluate situations and determine next actions by stakeholders.

The role of large corporations in smart cities is to move beyond the quantitative metrics and incorporate well-being and quality of life measures. Stakeholder commitment and leadership influence on the case projects was demonstrated when qualitative factors were incorporated into the decision-making process. The leaders exhibited commitment through demonstrable behavior.

If a key stakeholder applies strong change-agent characteristics, is comfortable working in complex political environments, and has a competency for technological innovation, this stakeholder has a profile (Smith, Binns and Tushman, 2010) that matches that of smart cities stakeholders who can use their strength and influence to balance business and share sustainable and socially responsible “pictures of the future” (Beer and Walton, 1990).

Though *politically correct* is a common term in society and seems to value an egalitarian mindset, there are differences in leadership and levels of commitment that must be recognized and nurtured in fitting situations. Each case study revealed the need to have the ‘right’ stakeholders for each project model. As one manager participant very high up in the firm made clear, “we need to have committed people” managing the project. In an egalitarian society, it is not correct and fair to imagine that some individuals are more right than others for a job, but some just will not work out well in the environment.

This is not a debate about diversity. Diversity strengthens a team (Ely and Thomas, 2001; Jayne and Dipboye, 2004), but all must be committed and motivated to be part of the transformation. The intent is not to be exclusive but rather to have a strong team built on the strength of inclusion (Love and Dustin, 2014). The leadership must all take a part in the shared vision and manage to the commitment. There are strategic leaders who will create the plan and socialize it and there are leaders who need to carefully manage a specific set of stakeholders who are strongest on implementation. This combination will have a powerful effect on achieving strategic goals and long-term viability (Ackerman and Eden, 2010; Freeman, 1984).

There are three types of leaders: those who lead for the purpose of feeding their ego, those who lead to improve next steps in career growth or to increase their span of power and control, and those who lead from a transcendent perspective (Crossan, Vera and Nanjad, 2008). Their approach is different and motivated by a sense to serve and build other leaders in the process. Case studies research of environmental leaders showed that these leaders identify with the environmental and personal values that shape their vision and motivate and guide their work as effective leaders of environmental change (Egri and Herman, 2000; Flannery and May, 1994; Lerner, 1998; McCormick, 1989; Westley, 1997). This was apparent on the smart cities cases.

Inclusion was evident across all of these projects. Leadership through inquiry and recognizing the value of problem solving and including stakeholders as part of the resolution is key in smart cities environments. “Successful leaders have an attitude that supports learning and growth… successful leaders create cultures that value inclusion, not exclusion, and they know that every person can make valuable contributions to the team when encouraged and given the opportunity. They support innovation and new approaches to familiar problems and opportunities and they reward individuals and teams for a job well done.” (Hesselbein and Shrader, 2008, p.159)

My research interviews with the leaders of Gaia Trust (Appendix J), a Danish agency founded in 1987 that provides charitable grants to support sustainable projects, revealed that a transcendent leadership approach and inclusiveness was a theme that materialized and permeates their body of work. The founding leaders of this trust are visionaries, transcendent leaders who share their vision for a more holistic planet earth. Their work and donations led to the founding and building of an international network to sponsor ecovillages, the Global Ecovillage Network (GEN) (Appendix I). From there, they started Gaia Education, delivering ecovillage, sustainability, and permaculture education worldwide as a result of their initial program to build a network for sharing ecovillage experiences.

The criteria for selecting and promoting leaders in organizations with sustainability goals should include evaluating their personal values and looking for qualities of eco-centric, self-transcendence, and openness-to-change values with a “diverse repertoire” of transformational leadership and transactional management skills, as well as the ability to switch roles quickly in response to complex and turbulent environments (Egri and Herman, 2000).

Transcendent leaders are exemplary on transformational projects where they can convert their passion into disciplined action to get the results they want. They are strong and engaging, and they build partnerships both inside and outside their organization. They recognize potential and take care to develop others so that they are continually growing leaders (Santamour, 2010).

The participants in the San José case study were from different organizations and had different reasons to be on the project. They each shared, however, that they work with and for each other and are "together for the long haul." They felt that, in that regard, San José is unique. This sentiment was expressed multiple times.

The typical bureaucrat is not the person to engage, although they are often the turning point in a project cycle. However, quite often it is also a stall point if the employee is interested in the project for their own gain only. Private sector is influencing change in the city and finding the entrepreneurial people in the city government organizations who want to do it differently. Many of these individuals have found their passion and the 'right' niche to create opportunity within the city government. San José makes an effort to mentor employees into these types of roles where they define how they will make a difference, and then they 'own' it.

Ecovillages require an entrepreneurial spirit to push beyond the norms and make their future vision a reality in the present. Both passion and commitment are needed to change the world. Passion strengthens the emotional and psychological representation of commitment in connection with the ecovillage culture.

- On individuality, a key sponsor of the ecovillage shared, "Every piece of the project must have someone's passion associated with it to make sure it is successful."
- On individual change agency at the citizen level, the project leader offered, "The citizens in smart cities need to participate in the change."
- A city council member created a plan where, "The residents of San José need to be a part of these solutions."
- A founder stated, "Ecovillages are all inclusive of the individuals in the community."

Communicating the commitment to change to the community helps get others involved. San José reports the progress and shares the real-life challenges with the community so everyone can learn. They share pictures and a live camera of the habitat, but they do not post cameras all over the city where there is no reason to do so. They are teaching the residents that it is important to be thinking globally but they are showing them how they can change behaviors

and act locally. The technologies that San José integrates into the city help companies take their innovation further in the world. In the process, they help create more opportunity and increase employment. San José plans buildings to make use of the good weather and sunlight available and plan lighting and HVAC to maximize what nature supplies already. When planning furnaces, they first examine where and how to use solar and then balance both to optimize an energy-efficient plan.

One CIO stakeholder interviewed shared, “Based on my experience, I could do anything else but I am focused on job satisfaction and I want to build something that has meaning. We are encouraged to explore here in the organization and they are willing to let me work as hard as I want to for the change.”

On individual change leadership and passion, a city council member shared, “When you do business then you must make sure you connect with the people. That is the most important part of any business. Find good partners and build a good group. Build a successful proven method and work with all the local partners. Think global and build local.” He felt that the best investment is to gain more knowledge. There is no risk to learning more about the people so that you can make the best decisions for the people as a stakeholder leader for change.

Stakeholder Commitment Embraces Transformational Paradox

Change as routine may present the greatest paradox for stakeholders to adjust to as part of transformation in process. The transformational nature of these projects (Fiol, 2002) implies that paradox will require the stakeholder to navigate, investigate, and manage through the paradoxes identified with the change (Vince and Broussine, 1996). Emotions play a key role in managing paradox, particularly in an eco-social change setting. Emotions can become elevated and it is important to “encourage reasonable behavior, which includes among other things cooperation, constructive activity, and civility” (Kaplan and Kaplan, 2009).

Collaboration and adaptive leadership on these projects offers an opportunity to capitalize on the paradox (Fiol, 2002), get comfortable in the role and make progress through the paradox (Storey and Salaman, 2009). Building trust (Dervitsiotis, 2003; Karlsen, Graae and Massaoud, 2008) and stakeholder capacity as contributing team member, whether in a leader or follower role, and sometimes both, are essential immediate goals (Monroe, Plate and Oxarart, 2013) to make progress on the larger, longer-term desired outcomes.

Luscher and Lewis (2008) invite “future research to further delineate uses for paradoxical inquiry and characteristics conducive to a paradox lens” (Luscher and Lewis, p. 236; Poole and Van de Ven, 1989). This smart cities research and its case studies provided a rich source as there were many “divergent approaches” (Luscher and Lewis, p. 237).

I valued the shared sensemaking that came from using paradoxical inquiry (Luscher and Lewis, 2008) as part of my research approach in interviewing participants. It also provided compelling reflexivity (Coghlan and Brannick, 2010; Cunliffe, 2010) during analysis and interpretation. There is a need for more than binary thinking by stakeholders on these transformational projects. Integrative thinking (Martin 2007) for alternative solutions supports innovation and transformation.

Recognizing the partnership of complexity (Dooley, 2004; DeSanctis and Poole, 1994; Churchill, 1990) and adaptability (Choi, Dooley and Rungtusanatham, 2001) in situations requires that solutions and answers are often on a sliding scale and not weighted toward either end of the spectrum. There is often no answer but a need to make progress regardless of the ambiguity that paradox creates and to define a path toward the end goal. A proposed scale as a model for weighing the paradoxical values and navigating the identified paradox (Jay, 2013) in smart cities, urban villages, and ecovillage situations could identify stakeholder leadership (Fiol, 2002; Lewis, 2000) and commitment in change situations. Making sense of paradox (Smith and Lewis, 2011; Luscher and Lewis, 2008) by showing the capability to dynamically adjust controlling (Gilbert and Sutherland, 2013) yet shaping (Palmer and Dunford, 2008) and the ability to be linear while multi-dimensional (Kilduff and Dougherty, 2000) are key paradoxical values that help move complexity toward simplicity amidst transformational change.

Instances of paradox that were identified in the analysis of the case studies include:

- Change and routine
- Think global, act local
- Public project or private project
- Individual stakeholder and cooperative collective stakeholder goals
- Secure data but openness to have access to it
- New to get to old way of doing things
- Urban and rural village in the same setting
- High-carbon footprint required to get to a low-carbon sustainable economy

- High-tech required to get back to low-tech
- Comfort in discomfort
- City bureaucrat as entrepreneur
- Scaling up and scaling down at the same time
- Individual data privacy versus gathering collective data for better insights to support the people
- Economic profit with sustainable gain
- Create an environment to support autonomy by defining group process
- No tech needed but we also want tech to deliver our mission across the globe
- Part of the problem and part of the solution

Stakeholder Commitment Uses Education for Inclusion

Education was a common theme in each case study (Yin, 2013) on many levels. The citizens of the world still need to be educated to understand how an unending push toward a global economic growth model correlates to ecological destruction, and the majority need to understand how related inefficiencies and current destructive industries threaten our world's future on so many levels. There was an identified need to educate the employees and stakeholders connected to these smart cities and smart villages' initiatives. This includes educating the audience with the right information that will allow them to be successful in their role and as part of the larger whole, including public officials, vendors, suppliers, residents, project leaders, city managers, residents, patients, services delivery personnel, and so on.

It is important to provide a vehicle to educate these participants at a level that helps them understand and perform the unique role that they play in solving the problem. There is also the potential to educate the groups and individuals who want an alternative means of living and who want to be part of the change by sharing the models of transformation provided by the cooperative organizations. Education and enablement, through storytelling (Weick, 2001) could incorporate the specifics of economic, eco-social, cultural, and political levels. Although the ecovillage has started to offer a solution, there is much more progress to be made to wider audiences.

Small ecovillages offer education on specific knowledge, controls, and skills to help an ecovillage team make progress on a small scale, thus providing the "sustaining factor" that

requires everyone in the community to make an effort. If an individual knows better, they will do better, so education and ownership needs to be at the individual level. Awareness, education, and responsibility will cultivate a change in behavior.

At the city level, the level of ownership is often held by the city and the residents are educated on the program goals only through press releases about new policies or initiatives. However, “smart” is creating a need for the people to be part of this change and including the public to act (Gerasidi et al., 2009).

San José is also being very smart about how they educate the public to help the Green Vision be successful through their transparent management and reporting and by providing updates regarding progress to making goals and how people can get involved. They share that more education is needed; for example, educating a small business about the economics of being smart and successful in San José is good for San José and for that business. It is good for the public in terms of services that the city can expand and provide from the revenue, for more jobs and for the bottom-line revenue of the business.

Stakeholder Commitment on All Projects Drive Sustainability to Improve Quality of Life

Referring back to identifying the problem and having the foresight of sustainability, “A collective awakening of conscience is needed…” (Destatte, 2010, p. 1577) was the conclusion of the 1972 MIT report to ensure a sustainable outcome for global welfare. Collectivism is measured in relationship to how individuals value group goals and cooperate to create group norms and ensure group well-being (Dierdorff, Bell and Belohlav, 2011; Wagner, 1995) during the continuous process of change.

Participants felt empowered to make changes that would impact society. The gap between smart cities and ecovillages is not really that wide. There are so many common themes and connection points that agreements for cooperation through harmonious dialogue do not need to be too far apart. There is also room for both of these models, large scale and small scale, to continue on parallel paths and to converge in uniform approaches to transformation for sustainability of our world.

Both models are vital to a sustainable future and could benefit by defining common goals. They can help each other by bridging the gap and creating common environmental, social, economic, and ecological goals that go beyond the profit-focused business models that drive

the norms of the community, society, and the environment to suffer and degrade quality of living.

However, if large-scale projects such as smart cities dominate the landscape in scale and magnitude, they could continue to overpower the smaller-scale ecovillages. Large scaling up projects have access to new technologies, best practices for maximum efficiency and change management (Burnes, 2011; Burnes and Oswick, 2012), and often unlimited financial resources to support the project objectives. These projects encompass large amounts of land, city operations, and the population.

Smaller ecovillages are self-sufficient, organized, and managed internally and they are usually strapped into a small-scale financial model that can include trade/barter agreements with other small, self-organized ecovillages. As much as possible, they build their model to ensure that they are not bound to the dependencies on others. For example, they aim to “get off the grid,” “supply their own food supply,” and “create self-sustaining lifestyles.”

Smaller ecovillages consider their own environment to be self-sustaining and substantiate that this is more efficient than the high-yield efficiencies and best practices of large-scale operations. The perspectives are different and, when studied, the perspective depends on the bias of the researcher and the criteria of the study. Ecovillages have poor data management models and cannot build scale, yet this is exactly what they are trying to avoid. Their approach is purposeful, but smart cities view this as inefficient and lacking in performance and think large scale offers improvements.

In large smart cities there could be a model of many small ecovillages intertwined to support a large city model. Smaller ecovillages could have access to the expertise and support of the large entity, including technology and innovation application that could support building efficiencies into the local model. This may help the smaller ecovillage to increase their yield but not at the expense of the environment. In return, large cities could benefit from the local supply chain (think global, act local) and be ensured that the local supply chain includes locally produced organic and nourishing food, now in higher demand from a more conscientious society.

Jointly, they would create goals for small scale to feed into large scale for environmental preservation, thus linking urban village models into the continuum. Local entities would create the controls and govern activities and even adjust larger policies to fit local cultural and environmental concerns and define how they would make changes for the local ownership of

problems. An integration of Crossan, Lane and White's (1999) intuition, interpretation, integration, and institutionalization change model could be applied to harmonize the evolution of change between the communities.

These adjustments could help to sustain the planet and incorporate the strengths of smart cities, urban villages, and ecovillages by building dependency on both to make an effort to do better. This would generate interest from all levels of society and the population. In doing so, it could create new programs based on interest and cultivate new innovation that may be uncovered locally and shared globally.

If all entities agree to change the "norm" and to redefine profit goals to include not only financial measure but also by defining an interlock of economic profit, environmental profit, cultural profit, and social profit, sustainability has equitable consideration in decision-making.

In addition, Simon and Pauchant's (2000) learning model based on choices of change in crisis could be applied in a non-crisis environment of prepared change and behavioral, paradigmatic, and systemic change could provide integrative approaches and guidance across community and leadership boundaries.

At the core, quality of life issues for human beings are simplified into having the necessities to live and function in society. These included economic, social, and cultural factors until the 1970s when ecological factors became critical to ensuring the sustainability of the earth and humans.

The well-being of the community has an economic impact. In today's business environment, the economic, eco-social, and cultural goals must be defined into the investment scope or equation and must be monitored and measured for progress and return on investment with different criteria. If this step is not done, confusion can quickly lead to failure of the strategic intent of projects.

Sustainability is often placed on the opposite side of the spectrum of financial gain and competitive scope in business strategies (Collier, 2013), interpreted by free market leaders as a tradeoff of financial gain due to adoption of sustainability measures. In these projects, there is opportunity (Daly, 2013; Conrad and Hilchey, 2011) to balance both financial gain and sustainability with the assertion of new and innovative approaches. It can require a review of the timing of policies, decisions, and external factors that influence the leaders of these projects to prioritize one area or another or change direction and follow a 'different' path than the direct path that leads only to financial gain.

In this way, the economic or eco-social factor allows the people to create policy that is based on priority decisions and then pursue product development. Policy can drive optimum product development in sustainable settings and does not have a dependency on the scale of the project.

Chapter 6. Conclusion

This conclusion covers three main topics; summary of key findings, how these were used to influence practice in IBM and my contribution to scholarship from an academic and practitioner perspective.

Key findings identified the role of stakeholder commitment endures across multiple facets of smart cities projects. Stakeholder commitment:

- Explores data and information as knowledge
- Adopts technology and innovation as advantage
- Incorporates project planning and methodology
- Requires trans-organizational agreement and accountability
- Practices collective leadership approach and empowers individual change agency
- Embraces transformational paradox
- Uses education for inclusion
- Drives sustainability to improve quality of life

Findings of my action research were used to influence key changes in practice at IBM. They led to the development and delivery of a new smart cities engagement framework positioning stakeholder commitment as pivotal to project success in addition to the technology focus IBM traditionally had on projects in the past. Findings were applied to support immediate change on the IBM case project and resulted in new reporting and tracking systems and methodologies used on IBM Smart Cities' projects. In addition, changes were extended outside the Smart Cities practice and shared with a group defining the 'internet of things' key methodologies projects to incorporate best practices.

As a result of research outcomes, a new process was created that defined five stakeholder levels of the IBM Smart Cities project to be identified in early planning stages. The team implemented a robust stakeholder gathering phase for this case project that was adopted by other teams and incorporated into the larger practice methodologies. One of the first critical steps in new projects as a result is a complete assessment to identify and review the multi-tier stakeholder positions and required actions to gain commitment encompassing the relevant facets of stakeholder commitment. Each team is tasked with assigning specific names and relationships of these stakeholders and the expectation of contributions to be made related to technology and innovation, data content, trans-organizational agreements, planning and

methodology, leadership through paradox, education, and sustainability at different phases of the project. Once the stakeholder list is determined, a questionnaire is delivered to these stakeholders for more information to capture any unique organizational framework components, individual stakeholder traits, power relationships, joint expectations and any additional working information that may be relevant to the specific project moving forward. The IBM internal team now conducts extensive interviews for analysis and uses the information to prioritize key drivers, metrics, and participation for each stakeholder. IBM has moved beyond excel spreadsheet formats and is developing an online interactive smart map of stakeholders that provides a better visual overview of the stakeholder map for complex projects. This step is still IBM centric but efforts are being made to share the information gathered across stakeholder organizations where it is determined that it can help the project and does not interfere with proprietary guidelines.

Findings from external action research phases and the case studies of City of San Jose and Ecovillage Thailand, were brought back into IBM and further influenced change to the practice to assess value creation beyond financial and economic factors and incorporate social, political, cultural/spiritual factors on projects. Though technology remains the driver for IBM, the qualitative addition of data offers a holistic approach to providing additional insights to support expanding projects beyond a strict technology focus and incorporating sustainability

My contribution to scholarship includes both and academic and practitioner perspective. Following research of the selected external case studies, San Jose, California and Ecovillage Thailand, our IBM team started took a new approach and began investigating the contextual and content analytics of local feedback, via written comments and phone logs, as a process to integrate the ‘voice of the citizen’ insights. The intent was to increase decision-making input related to proposed changes in the city prior to city review meetings.

While my research was underway, IBM has expanded the firm’s definition and scope of IBM Smart Cities to include all size urban and rural projects that incorporate measures of interoperability, intelligence and information sharing to improve citizen quality of life, and require change to status quo to achieve defined goals of sustainability. Related to the smart cities projects’ evolution to incorporate more varied project scopes, in early 2015, IBM established a critical partnership with Twitter to expand on the theme of garnering social sentiment, by researching the content of tweets, from the public as stakeholders, to capture their input early and aggregate the public sentiment into immediate decision-making processes.

Breaking down barriers to gain the value of external project knowledge and shared experiences has been integrated into IBM's leadership practice. Applying change from outsider perspectives has also contributed to the evolution of our core IBM Smart Cities' methodologies. Most notably, IBM built a website inviting external contributors to share smart cities initiatives in a public domain for the larger community to access and learn from each other. This website is inclusive of all size 'smart cities' projects and approaches and is a major contrast to how IBM approached Smart Cities at the start of my research which was limited to large transformational technology-based projects led by IBM.

The IBM project team was able to improve practice methodologies to gain a better understanding of all surrounding circumstances and create a better balance in decision-making related quality of life issues, sustainability, economic, cultural, and societal factors. These are all critical in defining a strategy and implementing smart cities environments that improve the quality of life for the people and cannot be determined solely by quantitative data input. There is too much information and insight from experts and stakeholders that would be left out of a holistic decision making process.

The IBM team grasped onto building stakeholder commitment as they experienced improved results by engaging more purposefully with the people connected to the data, the stakeholders, that care and that need to build the commitment to the project. Whether stakeholders are technologists, business or city leaders, employees, or citizens, they comprise the people who will be committed and who will be the point of impact. This specific application helped the IBM team and can be generalized for other audiences and practitioners with a mission to increase stakeholder commitment.

My contribution to the body of academic knowledge examines practitioner application in diverse smart cities settings of existing theoretical concepts explored in the critical literature review regarding change management, technology and innovation. This work identified the need to secure trans-organizational stakeholder leaders who are committed to driving the overarching goals to achieve project outcomes and increase sustainability and overall quality of life in smart cities environs.

This detailed framework for stakeholder levels is under development and review for potential publication as a contribution to academic scholarship at a future date. This research project provided new insight by combining the already established technological, scientific, quantitative big data statistical approach and identified added value by incorporating

innovative, rich content, and qualitative insights from unstructured information to identify the added value of humanistic attributes of smart cities project, shared in case studies and provide a connection to the importance of stakeholder commitment on smart cities' captured in tacit knowledge as key findings.

An updated Smart Cities Stakeholder Engagement framework, see below, evolved as a result of this research to emphasize the essential role of the stakeholder as the apex and main driver of change to support sustainability goals.

Figure 6.1. Smart Cities Engagement Framework

This Smart Cities Stakeholder Engagement framework (see Figure 6.1) is being incorporated into a limited scope consultancy practice, to be applied and tested, and further updated to define core processes for future projects. It is also the topic of further research work to be carried out.

Chapter 7. Reflection

This chapter offers reflection on my contribution from this action research project. My research provided case studies viewed from a phenomenological lens to reveal the inclusion of qualitative insights toward growth through development (Daly, 2013). Ecological economists share that smart cities, built on the strong foundation and values of sustainability, is not growth. It is development (Daly, 2013). Therefore, it is qualitative improvement and to achieve this requires more application of qualitative action research. Qualitative research approach helps us to understand the humanistic (Potter, 2013) quality and means to provide for the quality of life that sustainability can support in the 21st century.

I developed a comfort with the paradox of understanding so much on the topic but being aware that I knew only a fraction of the knowledge there was to gain. This self-awareness, ironically, made me stronger as a leader and provided a deeper sense of courage and sense of responsibility to continue my pursuit of research in this field of study and facilitate change as a leader practitioner. I am thankful that my participants did not hold back on sharing during those candid moments of “doubt but trust,” such as when my most difficult interviewee comfortably leaned forward and confided, “This is how my organization approaches it, but here is how I view it personally.” These are the people who contribute to making change happen. Their contributions to the topic and the case studies were priceless for my research.

In business, economic pressure has moved the overall goal of the organization today to focus on short-term financial achievements even if it is at the expense of other non-economically based goals. The literature informs us that the academic definition of business management strategy today is to succeed by maximizing shareholder value with a profitable, productive, and efficient triple bottom line (Norman and MacDonald, 2004). My research validated that this process cannot be done in isolation, considering the shareholder only, because multiple stakeholder groups (Clarkson, 1995) are taking on important components of identity (Lim, Ahn and Lee, 2005). Even nonprofit organizations and NGOs (Nunnenkamp and Öhler, 2012) are economically based because although they may be funded and created by entities with a common eco-social or environmental or other cause or interest, to be sustainable they must make decisions that keep them financially viable.

Smart cities, urban villages, and ecovillages projects invite participants as stakeholders to change our worldview and to think and act differently. The complexity involved to support the transformation from a financial bottom line to a triple bottom line (Dess, et al, 2012) can be

baffling because it introduces a new paradigm for defining investments, expected returns, and overall success although these are still based in quantitative measures.

Though my research incorporated qualitative factors, when examining the findings of my action research, I observed that people are still making decisions based heavily on quantitative data. They are looking to the business leader or manager who is financially driving the project or tracking objectives to metrics and measurable economic outcomes. They are learning from technology companies based in big data findings and relying on case studies and policies and regulations.

New questions arise regarding how will the qualitative findings affect decision-making in the future? Will the smart cities stakeholders' commitment ease off of structured, scientific, and quantifiable data-driven decision-making or will the incorporation of qualitative factors continue to map to quantifiable measures?

If we have a problem, ask questions (Marquardt, 2007; Torbert, 1999), listen and reflect, seek out paths (Pedler, 2008; Grint, 2005; Monk and Howard, 1998) of relevant knowledge that generates new ideas we leave convention and static beliefs behind. We are the change – the difference that will champion change and progress an organization into a new era of innovation, efficiency and productivity. The related change provides a rich landscape for action research. We are part of the problem, but we are also part of the resolution (Grint, 2005).

Chapter 8. Future Research

This chapter considers areas for future research. In conducting my research, on multiple occasions there was opportunity to explore deeper into many subject areas related to this topic. Participants were very informative, but I had to leave many topics unaddressed for the duration of the current research scope.

One area of future opportunity for related research offered to me by a participant was to "research regional case studies including a phenomenological research study on the specific approach of smart cities for a specific segment of the population." The "silver" industry in China reached out to me specifically to help them solve problems that they are experiencing with the cultural shift that is underway. They recognize that the US has not had the tradition of caring for the elderly at home and there may be an action research approach to work with the ministry in China to take on independent research.

Another potential area is: "How can stakeholders in Asia address all new cities projects versus modernizing older cities?" Both are smart cities but "rip and replace" is a different project from all new building from green field and up.

Multiple topics arise from this one starting point and my research could take many different directions in the future. The topics of paradox, situation-complex organizations, transcendent leadership, innovative financing, sustainability, and innovative tech for smart cities are all possible paths. Problems related to complex strategic change in global settings could be a future branch of research related to smart cities.

Finally, the world is becoming more interconnected every day (Korsten and Seider, 2010) with the evolution of ICT to IOT (Chaves-Diéguez et al, 2015) and our way of living, working, and treating the planet needs to be more closely interconnected. We can move beyond institutionally supported attitudes and approaches.

Chapter 9. Limitations

One limitation arose during my research.

1) I received an exception approval to use IBM Content Analytics software for my research study. The terms defined granted permission to install a single, unique instance of the program on a designated single machine in the lab. I was approved to load my data, run results, and take hand written notes of key findings. In accordance with ethical procedures of my research aligned with the stated terms, I agreed to remove all data, delete any created files, and uninstall the program upon completion. I was not permitted to print any pages or save any screen showing my results or the software program interface due to agreed-upon defined limited license use. In agreement and as a matter of ethics, I did not include screen shots in this paper.

Word count: 51788

Appendices

Appendix A. Research Information Sheet and Research Participant Consent Form

Committee on Research Ethics

Participant Information Sheet

Version 3.0 finalized 18 June 2013

Title of Study

Smart Cities: The Role of Stakeholder Management

Invitation to Participate:

You are being invited to participate in a research study conducted as part of my dissertation area of focus for the University of Liverpool, Doctorate Business Administration. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask me if you would like more information or if there is anything that you do not understand. Please also feel free to discuss this with your friends, relatives and others if you wish. I would like to stress that you do not have to accept this invitation and should only agree to take part if you want to. Thank you for reading this Information Sheet.

1. What is the purpose of the study?

I want to study stakeholders and their relationship to the areas of both crisis and change management, and technology and innovation to extend the knowledge of current academic theory as it is applied on smart cities as a force of change on smart cities projects.

My specific action research plan will take a phenomonological approach of 3 uniques smart cities projects to understand the relevance of existing theoretical research of stakeholder commitment in relation to crisis and change management and technology innovation. Through observation, interviewing and participatory action research, I will gather data for analysis. Using direct interpretation and exploring patterns I will identify thematic experiences of stakeholder levels of commitment influencing smart cities projects.

As a participant you will be fully debriefed at the end of the research.

2. Why have I been chosen to take part?

Participants will be chosen to participate in the research study based on their role and responsibilities as key stakeholders, influencers, project leaders, decision makers and or other project management functions directly affiliated with one of the selected Smart Cities project.

3. Do I have to take part?

Your participation is voluntary and as a participant you are free to withdraw at any time without explanation and without incurring a disadvantage.

4. What will happen if I take part?

As a participant, you may be asked to participate in the initial research project inquiry phase where the researcher will be gathering information related to the identification of your current smart cities assignment.

You may be asked to respond to a survey regarding your scope of knowledge regarding smart cities projects, your role, you responsibilities, communication processes and project execution. You may be asked to provide feedback on stakeholder participation and management, decision making processes, change management, technology solutions and sustainability and corporate social responsibility factors related to the project.

You may be asked for an interview or to approve the researcher observe you interacting as part of a group or in an individual workplace environment related to your project role and responsibilities.

If appropriate and deemed allowed, you may be asked to share copies of source documents or archives related to project activities, project interactions and other content that may be meaningful and acceptable to use in project exploration, discovery and knowledge sharing.

You will have an option to approve whether you interview can be recorded (either audio / visual recording) and the details will always be reviewed with you again prior to conducting the interview.

If legal counsel review and consent is required to determine if you can participate please do so prior to signing the consent form.

5. Expenses and / or payments

You will not be asked or expected to incur any expenses or make any payment related to this research.

6. Are there any risks in taking part?

At this time, it is determined that there are no perceived disadvantages or risks involved with your participation in this study. However, if you should experience any discomfort or disadvantage as part of this research please make this known to the researcher(s) immediately.

7. Are there any benefits in taking part?

The benefit of participating in this research is to contribute to existing theory in an applied project setting that can provide new insight regarding forces that affect stakeholder commitment in smart cities projects. You can determine if you want to have your identification included and insights attributed to you in the research report or if you want to remain anonymous. This will be clarified and you will have an opportunity to provide consent or request anonymity at review phase, as well.

8. What if I am unhappy or if there is a problem?

The UL Committee on Research Ethics offers, “If you are unhappy, or if there is a problem, please feel free to contact the UL Committee on Research Ethics. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the

Research Governance Officer on 0151 794 8290 (ethics@liv.ac.uk). When contacting the Research Governance Officer, please provide details of the name of the study, the researcher(s) involved, and the details of the complaint you wish to make."

9. Will my participation be kept confidential?

Data will be collected by the Primary Researcher and stored securely. Survey submissions are anonymous and interviews will remain confidential unless otherwise agreed upon as expert contribution to be attributed to the participant. The data will be used for this research instance only unless otherwise agreed upon by the participant. Data will remain archived until the dissertation is completed and any related written contribution is published. Data will be disposed of in accordance with treatment of strict confidential content.

Disclosure of criminal activity

If this research exposes serious criminal activity participants confidentiality may not always be assured as appropriate legal procedures may require the researcher to disclose information related to any legal proceedings.

10. Will my taking part be covered by an insurance scheme?

Participants taking part in a University of Liverpool ethically approved study will have cover.

11. What will happen to the results of the study?

The results of this research will be made available to the participants for review in written draft form prior to any finalization of a report. It is the intent of the researcher to publish results as part of a case study or related research article. Any publication will be made available

participants. Participants will not be identifiable from the results unless they have consented to being so.

12. What will happen if I want to stop taking part?

Participants can withdraw at any time, without explanation. Results up to the period of withdrawal may be used, if you are happy for this to be done. Otherwise you may request that they are destroyed and no further use is made of them.

13. Who can I contact if I have further questions?

The key researcher is Kathleen Grave, (address provided), USA. Kathleen can be contacted at the phone number: + 1 (provided).

Duty of care to research participants

> This research is not related to any conditions or external factors that would expose you to risk of incurring a medical condition, financial debt, or legal concerns.

Information Sheet

Version 3.0

18 June 2013

==========

RESEARCH PARTICIPANT CONSENT FORM

Title of Research Project:

Smart Cities: The Role of Stakeholder Commitment

Please initial box

Researcher(s): Kathleen Grave

1. I confirm that I have read and have understood the information sheet dated [DATE] for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected. ☐
3. I understand that, under the Data Protection Act, I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish. ☐
4. I agree to take part in the above study. ☐

_____ _____ _____

Participant Name Date Signature

_____ _____ _____

Name of Person taking consent Date Signature

_____ _____ _____

Researcher Date Signature

The contact details of lead Researcher (Principal Investigator) are:

Kathleen Grave

Phone: +1 (phone provided)

Email: Kathleen.grave@my.ohecampus.com

Work address: (address provided) USA

Appendix B. Journal Log Pages

DBA

May 19-31

Plan who needs to be part of research in Asia while traveling. Share update on starting my project with them and approach over new few months
Review my proposal with academic mentors and get improve scope

========== May 9-15

Skype Meeting with Supervisor – Dr Diamantis

DBA Action Research Plan – Timeline details
My DBA Proposal – Review Feedback
Review Ethical Approval Template and Consent Form
Start of Study Information Document?

Socialized research topic in peer meeting discussion at Tampa –IBM and partners
Make list of desired interview participants

========== Apr 10- May 1

Crit Lit Reviews
Order Books
Review IBM Content
Management Leadership discussion of my role as researcher - IBM

========== Apr 10

Updated Proposal in Wiggio including updated plan/schedule. Note Dr D

The News is IN:

========== Apr 3

Subject : **Re: Doctoral Thesis Supervisor**
Date : Wed, Apr 03, 2013 07:17 PM CEST
From : Evangelia Katsikea <evangelia.katsikea@my.ohecampus.com>
To : kathleen.grave@my.ohecampus.com
CC : Pascale Hardy <pascale.hardy@my.ohecampus.com>, Dimitrios Diamantis <dimitrios.diamantis@my.ohecampus.com>

Dear Kathleen,
I am happy to inform you that the matching with Dimitrios Diamantis has been approved. Your Doctoral Thesis Supervisor Dimitrios Diamantis will provide you with advice and guidance, but the responsibility for the content of your doctoral thesis and your ability to meet this goal is yours.
On behalf of University of Liverpool and Laureate Online Education, we would like to wish you every success in this challenging part of your studies.

With Best Regards,
Eva Katsikea,
Theses Faculty Manager
cc: Academic Director
cc: Doctoral Thesis Supervisor

========== *Jan 2014*

Interviewing again, remember:

•Humble Inquiry

•Depth, detail, nuance, richness

•ASK-Listen share, care, dare and be aware

•Empathy, tough, sensitivity

The right balance of all of the above will guide a good interview

Appendix C. Survey and Survey Analysis Worksheet Exhibit

Smart Cities Research Survey

Q1 ABOUT YOU

Q2 What is your Gender?

- ❍ Male
- ❍ Female

Q3 What is your Age?

- ❍ 25-29
- ❍ 30-35
- ❍ 36-40
- ❍ 40-45
- ❍ 46-50
- ❍ over 50

Q21 In which geography do you work?

- ❍ Americas
- ❍ Asean
- ❍ Asia
- ❍ Europe
- ❍ Japan
- ❍ Middle East/Africa
- ❍ Worldwide

Q4 Which category is most accurately defines your current employer?

- ❑ Corporation

- ❑ Small-medium enterprise
- ❑ Non-profit organization
- ❑ Self-employed private company
- ❑ Government or Federal Agency

Q5 How many years of professional work experience do you have?

- ❍ Less than 1
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ More than 20

Q6 How many years have you been employed at your current company?

- ❍ Less than 1
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ More than 20

Q7 How many years have you been in your current position at your current employer?

- ❍ Less than 1
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ More than 20

Q59 ABOUT YOUR ORGANIZATION

Q54 Does your organization focus on Smart Cities initiatives?

- ❍ Yes, we have projects in progress
- ❍ We are just getting started
- ❍ No projects in plan

Q51 Which of the categories below best describes your organization?

- ❍ Profit-based corporation or business
- ❍ Public sector
- ❍ Non-governmental organization or non-profit
- ❍ Education or Research
- ❍ Consulting and Integration Services

Q52 Which segment best describes your primary industry focus?

- ❍ Energy/Solar/Wind
- ❍ Environment/Air Ecology
- ❍ Health Services
- ❍ Technology
- ❍ Transportation/Roadways
- ❍ Water
- ❍ Other

Q55 ABOUT YOUR SMART CITIES PROJECT EXPERIENCE

Q11 Who is the most critical resource to your smart cities project success?

- ❍ Elected official
- ❍ Civilian role in city management
- ❍ Technologist
- ❍ Consultant/advisor
- ❍ Business Leader or Manager
- ❍ Other _____

Q8 Show how important each of the factors below are to the successful outcome of a smart cities project?

_____ Leaders and stakeholders
_____ Process and change management
_____ Technology and innovation
_____ Schedule and cost management

Q58 In order of importance which of these topics are most useful to help your work on smart cities projects?

_____ Best practices
_____ Case studies
_____ Policies and regulations
_____ Technology solutions for industry
_____ Implementation Methodologies
_____ Sources for funding
_____ Sustainability standards

Q56 Which of the following, if any, are useful sources of information for your smart cities projects? Please check all that apply. Attend conference

- ❑ Online special interest groups

- ❑ Technology company web site
- ❑ Consultant Website
- ❑ Classroom education
- ❑ Social media, blogs
- ❑ Books and articles
- ❑ Clubs and community programs

Q49 YOUR CONTRIBUTION IS APPRECIATED

Q40 Optional: This survey is anonymous and I appreciate your contribution. If you are willing to share your identity for a future interview focused on smart cities, please share your name and contact information below or reach out to me in a separate e-mail.

_____

_____

Q45 Please add any additional information, experience, stories, examples, topics of importance that you would like to share in the free text box below. Thank you.

_____

_____

Q50 THE END - THANK YOU

==========

Outcomes:

The tables below represent survey responses by geography, sector, and key industry solution areas:

Total 128	Survey Responses Completed	
Responses by Geography		
59	46%	Americas
42	33%	Europe and Middle East
27	21%	Asia and ANZ
Responses by Sector		
45	35%	Public sector
35	27%	Private entity and industry
24	19%	Education/Research
22	17%	NGO/Civilian roles
2	Less than 2%	Other
Responses by Industry Solution		
37	29%	Alternative energy (fuel/solar/wind)
33	26%	Health
30	23%	Environment
18	14%	Water
10	8%	Transportation and roadways

Survey responses by geography, sector, and key industry solution areas.

#	Answer	Bar	Response	%

1	Elected official	0.209302326	9	21%
2	Civilian role in city management	0.255813953	11	26%
3	Technologist	0.023255814	1	2%
4	Consultant/advisor	0.093023256	4	9%
5	Business leader or manager	0.348837209	15	35%
6	Other	0.069767442	3	7%
	Total		43	100%

Stakeholders' responses to the question: Who is the most critical resource to your smart cities project success? Stakeholders believe that the business leader or manager is the most critical resource to the success of smart cities projects.

The stakeholders are obtaining the most valuable information by attending conferences, visiting technology company websites, clubs and community programs, and online special interest groups. In my interviews, I asked each participant where they sourced their information, and the answers correlated with the quantitative findings from the survey. The table below shows stakeholders' responses to the question: *Which of the following, if any, are useful sources of information for your smart cities projects? Please check all that apply.*

#	Answer	Bar	Response	%
1	Attend conference	0.767442	33	77%
2	Online special interest groups	0.441860	19	44%
4	Technology company website	0.488372	21	49%
5	Consultant website	0.372093	16	37%
6	Classroom education	0.162791	7	16%
7	Social media, blogs	0.255814	11	26%
8	Books and articles	0.279070	12	28%

9	Clubs and community programs	0.441860	19	44%

Appendix C. Table 1. Survey results of useful sources for information for smart cities projects.

Quantitative data analysis summary from the survey showed that the majority of project participants look to a business leader or manager as the most influential and critical resource to project success. They also feel that the most useful source of information is provided at subject related conferences, technology company websites, and then online special interest groups and clubs and community programs. The participants are learning from information about best practices, case studies, and policies and regulations. Seasoned professionals also want more information about sources of funding and sustainability related to smart cities.

Experience to Importance

Sources of funding and Sustainability were more popular with higher experience, but are not dependent on work experience.
Some exclusivity exists between Sustainabilty and Implimentation with work experience, as when there was a high volume of Implementation there was a very low volume of Sustainability responses

Experience to Success

For Elected officials and civilian roles there is a small varriance with people with more experience. Meaning more experienced professionals feel that this is important (a stronger correlation).

	Respondent	ssional work	been employe	your current	focus on Sm	elow best des	escribes your	rce to your s	useful / inform	eful / informati	useful / informe	ful / informato	st useful / to	ost useful / t	seful / to help	/ to help your
Respondent	1															
How many years of profes	0.20584899	1														
How many years have you	0.08680836	0.64509858	1													
How many years have you	0.22163572	0.53080315	0.53535246	1												
Does your organization fo	-0.020395	-0.3551391	-0.5110626	-0.2951895	1											
Which of the categories be	0.11402839	0.0776854	-0.0943291	-0.0155018	0.06946739	1										
Which segment best desc	0.06731983	0.29701642	0.16221418	0.38844437	0.03106679	0.02950039	1									
Who is the most critical re	0.17339915	-0.1503295	-0.0420797	0.08066217	-0.0055687	-0.238662	0.21302744	1								
Please check the topic bel	0.12499515	0.25884811	0.24679676	0.27247128	-0.1047515	0.10685498	-0.001521	-0.1828539	1							
Please check the topic bel	-0.0017647	0.03429569	0.16429127	0.25417589	-0.2022107	-0.069796	0.069317	0.12501538	0.49692394	1						
Please check the topic bel	0.10490094	-0.0898845	0.02454957	-0.0518796	0.01226718	-0.1604637	-0.0951083	0.00583427	0.52269879	0.34459398	1					
Please check the topic bel	-0.0998171	-0.1208381	-0.2243892	-0.2830825	0.04037602	0.13262957	-0.1601386	-0.1032737	0.45069237	0.48333232	0.49490844	1				
In order of importance whi	0.05891471	-0.0551885	0.19631839	0.00998199	-0.082845	-0.0855142	-0.1320528	-0.3665754	0.05677455	-0.2349946	-0.1061606	-0.0944371	1			
In order of importance whi	-0.147275	-0.1095945	0.07192123	-0.0277924	-0.1541882	-0.1332566	0.03602338	-0.0299512	0.07753703	0.11849971	0.17829671	0.22428329	-0.0933567	1		
In order of importance whi	-0.0933917	-0.1838288	-0.092814	-0.0588025	-0.0381563	-0.1258615	-0.0595036	0.39817017	-0.036093	0.03996091	0.13196472	0.10034885	-0.1977508	-0.2128844	1	
In order of importance whi	0.05291974	0.14629314	0.02989835	-0.0481602	0.09430442	0.54560865	-0.0345583	-0.2385055	0.18911097	0.14188595	-0.2253766	0.04596047	-0.036656	-0.3131949	-0.1617405	1
In order of importance whi	0.2549021	-0.0532342	-0.4719649	-0.2491888	0.39046275	-0.179424	-0.0886113	0.06985547	-0.1737611	-0.2679896	-0.1155608	-0.0575682	-0.0812901	-0.1120792	-0.1450445	-0.0268861
In order of importance whi	0.04164121	0.00084511	-0.1764322	0.08545752	0.21847484	-0.1385393	0.01136066	0.16543033	-0.0499337	-0.1297903	0.2332032	-0.2025578	-0.3934628	0.05477142	-0.1483963	-0.3600376
In order of importance whi	-0.1628054	0.16145029	0.36907278	0.19195411	-0.3861985	0.06667363	0.2051363	-0.0317252	-0.0261609	0.28928513	-0.0661203	0.07143838	-0.102285	-0.0062547	-0.1346599	-0.1080165
Which of the following, if a	0.21735956	-0.0267379	-0.0593014	-0.0459968	0.20201989	-0.0564076	-0.2293359	0.10173978	0.1153205	-0.1225204	0.04147135	-0.0792841	-0.0134155	-0.067072	0.02800916	-0.1684486
Which of the following, if a	-0.1132084	0.07581949	0.00967486	-0.0097823	-0.063212	0.30733726	-0.1981838	0.02163741	0.06240834	0.15555889	-0.319714	-0.0185624	-0.1255374	-0.2046214	0.11979832	0.42138945
Which of the following, if a	-0.0674825	-0.0209238	0.13181939	-0.0785586	0.05495015	-0.0170261	-0.0833597	0.16275885	-0.2478941	-0.2430257	0.02855112	0.00937788	0.02667798	-0.2003563	0.35179314	-0.2125724
Which of the following, if a	-4.132E-17	0.13415615	0.15619958	0.07872796	-0.2475995	0.23535198	0.12058207	-0.0330279	0.09536017	0.01586016	0.09265384	0.25810867	-0.1413924	0.1546392	0.22984201	-0.0188233
Which of the following, if a	0.05076208	0.10425774	0.09946781	0.07456786	0.21523683	0.05840213	0.0616282	0.0257799	0.14894001	0.01415851	-0.0450053	-0.2021703	-0.1562283	-0.0145567	-0.0836917	0.13114937
Which of the following, if a	-0.1417367	-0.0910905	-0.1769743	-0.1744334	0.16187993	-0.0182055	-0.2419739	-0.0478473	0.38123064	0.19996912	0.06499165	0.20755174	0.01757399	-0.0055985	0.00903992	0.20182649
Which of the following, if a	0.07938195	0.15856167	0.15914424	0.16065401	-0.0590506	0.26500735	0.04844369	0.1793286	0.1711041	0.07063652	0.06339851	-0.1202731	-0.0743263	-0.1208987	-0.0190527	0.20284615
Which of the following, if a	-0.0150944	0.07581949	-0.0794721	0.13043093	0.10667022	-0.0611247	0.04529915	0.15455296	0.17727832	-0.074217	-0.1053024	-0.1772915	-0.1255374	0.04918783	-0.0509639	0.11189068

	.6-.8	Strong
	.4-.6	Moderate
	.2-.4	Weak
	0-.2	None to extremely weak

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.533099
R Square	0.284194
Adjusted R Square	-0.07117
Standard Error	12.78478
Observations	43

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	14	1881.934	134.4239	0.885675569	0.58137
Residual	29	4740.066	163.4505		
Total	43	6622			

	Coefficients	*tandard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-38.1639	49.41978	-0.77224	0.446221349	-139.239	62.91095	-139.239	62.91095
How many years of professional work experience do you have?	0.440637	2.82043	0.15623	0.876933978	-5.32779	6.209065	-5.32779	6.209065
How many years have you been employed at your current company?	1.12139	2.468383	0.454301	0.652994137	-3.92702	6.169799	-3.92702	6.169799
How many years have you been in your current position at your current e	1.796984	1.969777	0.912278	0.369144431	-2.23166	5.825632	-2.23166	5.825632
Does your organization focus on Smart Cities initiatives y/n	-1.47579	4.684008	-0.31507	0.754964202	-11.0557	8.104079	-11.0557	8.104079
Which of the categories below best describes your organization?	1.981186	1.347832	1.469906	0.152354056	-0.77544	4.737813	-0.77544	4.737813
Which segment best describes your primary industry focus	-0.31594	1.137262	-0.27781	0.783132039	-2.6419	2.010023	-2.6419	2.010023
Who is the most critical resource to your smart cities project / success?	2.118133	1.492129	1.419538	0.166402951	-0.93361	5.169879	-0.93361	5.169879
In order of importance which of these topics are most useful / to help yo	2.237909	2.230092	1.003505	0.323917485	-2.32314	6.79896	-2.32314	6.79896
In order of importance which of these topics are most useful / to help yo	0.297638	2.184271	0.136264	0.617346230	-4.1697	4.764974	-4.1697	4.764974
In order of importance which of these topics are most useful / to help yo	0.537087	2.210781	0.24294	0.809762151	-3.98447	5.058643	-3.98447	5.058643
In order of importance which of these topics are most useful / to help yo	3.948548	2.792969	1.413746	0.168082154	-1.76371	9.66081	-1.76371	9.66081
In order of importance which of these topics are most useful / to help yo	1.167345	2.347866	0.497194	0.62280081	-3.63458	5.96927	-3.63458	5.96927
In order of importance which of these topics are most useful / to help yo	0.681612	2.163066	0.315114	0.754931405	-3.74235	5.105578	-3.74235	5.105578

Appendix D. Interview Schedule

This appendix contains an overview of the interview schedule for the 3 case studies.

(Participants initials are changed from original source data to protect anonymity)

Case Studies Interview Schedule							
Case	Participant	Role	Forms emailed	Forms returned	Date of Interview	Location of interview	Transcribed
1	EN	Thought leader	Oct-13	email	Oct 30 2013	Asia	Nov-13
1	HL	Project leader	Oct-13	email	Nov 14 2013	Asia	Nov-13
1	MK	City manager	Oct-13	email	Nov 14 2013	Asia	Nov-13
1	FY	Vendor services-skills	Oct-13	email	Nov 15 2013	Asia	Nov-13
1	LS	Vendor product	Nov-13	in person	Nov 16 2013	Asia	Nov-13
1	EE	Business partner	Nov-13	email/in person	Nov 15 2017	Asia	Nov-13
1	SLT	Elected Official	Nov-13	in person	Dec 2 2013	Asia	Jan-14
2	RK	City council member	Feb-14	in person	Feb 17 2014	California	Feb-14
2	MT	Department leader	Feb-14	in person	Feb 17 2014	California	Feb-14
2	TW	Technologist	Feb-14	in person	March 12 2014	California	Mar-14
2	SD	Elected official	Mar-14	in person	March 12 2014	California	Mar-14
2	CT	Resident	Jun-14	in person	August 8 2014	California	Aug-14
3	KD	Sponsor	Dec-13	in person	Dec 19 2013	Thailand	Jan-14
3	DB	Leader	Feb-14	in person	March 14 2014	Thailand	Mar-14
3	DD	Project participant	Feb-14	email	March 14 2014	Thailand	Mar-14
3	TB	Technologist	Feb-14	email	May 19 2014	Thailand	May-14
3	JR	Founder	Jun-14	in person	June 25 2014	Denmark	Jul-14
3	JH	Founder	Jun-14	in person/email	June 25 2014	Denmark	Jul-14
3	WR	Educator-enablement	Jun-14	email	June 27 2014	Remote-conf call	Jul-14

Appendix E. Coding and Data Analysis Worksheets

Transcribed interview with initial coding markup

KMG: How do you use all the data your city collects?

DS: We collect huge amounts of data across many systems that are old and new.

The data needs to tell us what the next action might be.

The data analysis we need is what specific data leads us to drive our next actions.

We collect a mass amount of data but we think it might be overload to us and instead of helping it could restrict our progress.

We have seen hype on big data analysis.

We need to continue to collect the data real-time but we are not ready for the real-time analysis of it.

Instead we establish some baselines, look at what is available and look at how do we look at the data.

Phase 3 Code Map Quick Reference

Themes

stakeholder	leadership	organization	quality of life	education	planning	methodology	sustainability	change	innovation	data	technology

Description Codes Patten Map

city	leaders	IBM	health/healthcare	enablement	goals	program	green	change	innovation	program	systems
pecific roles (name	manage	ecovillage	safety	awareness	planning	project	eco-social	paradox	invent	data access	application
volunteer	vision	urban	water	teach	communication	requirements	economic	risk	create	analysis	integration
expert	accountability	team	transportation	communicate	schedule	policy	cultural	positive change	ideas	data reporting	technology
sponsor	ethics	administration	security	online	time	regulation	religious/spiritual	negative change		data security	monitor/sensor
		support	solar		achievement	finance	factors	force		data ownership	network
		pressure			budget		sustainability			internet	equipment
							environment			big data	industry

Secondary Cycle Categories

person	people	stakeholder		planning	process	policy		application	systems	innovation

Initial Cycle Codes

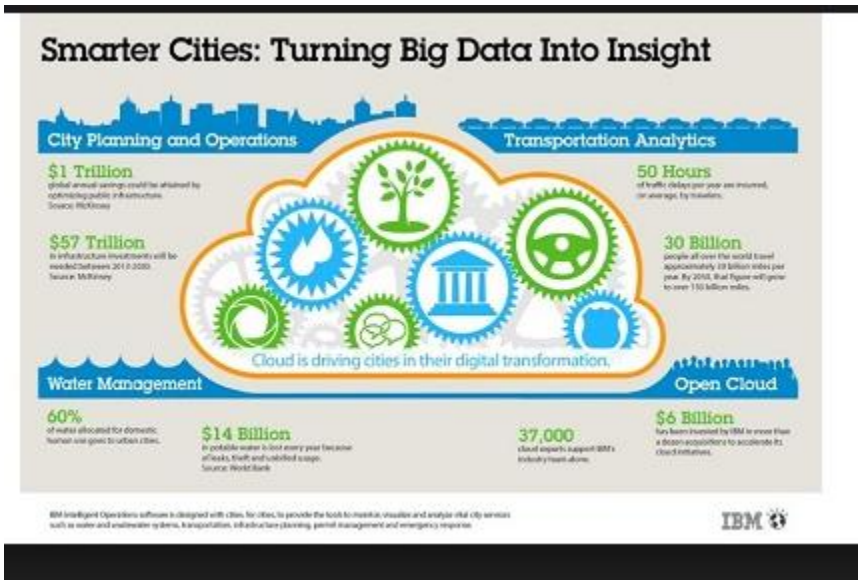
	people				process				systems	

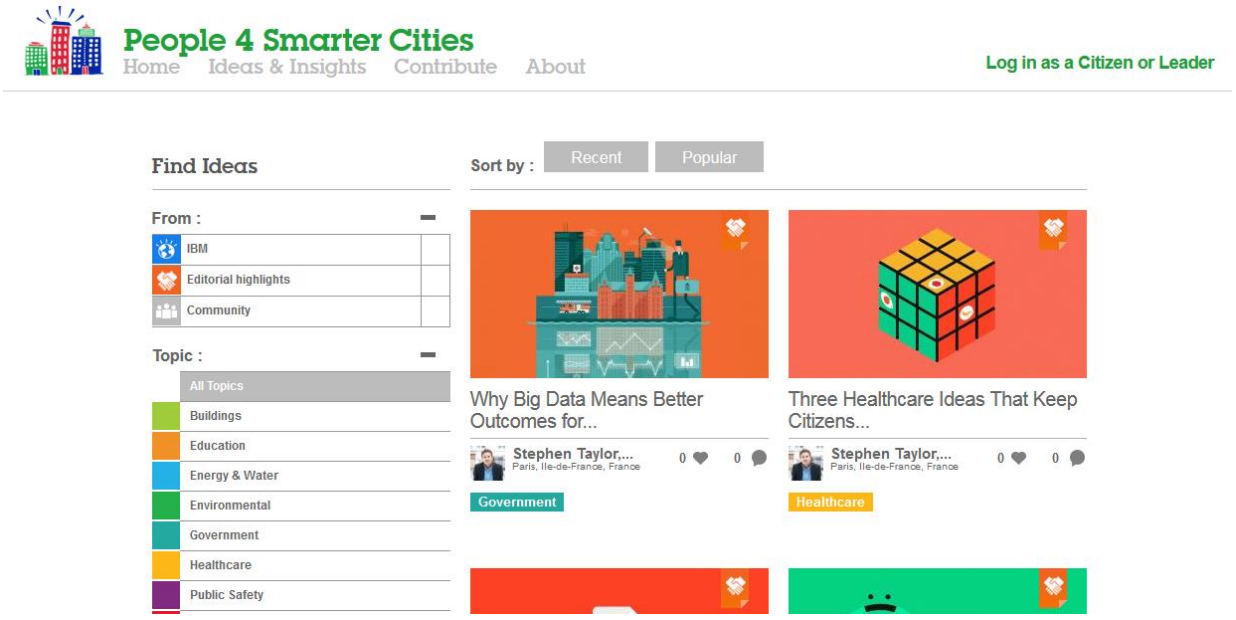
CODE MASTER

Interview reverse mapping to final themes for additional perspective

STAKEHOLDER	LEADERSHIP	SUSTAINABILITY	DATA	TECHNOLOGY	PROJECT PLANNING	EDUCATION
healthcare manager	my stakeholder role requires my k	green innovation	predictive data	healthcare program	process	an enablement team
like his consigliere	my experience only partially prepar	innovative healthcare	access to information	monitors (3)	administration	lead the awareness
my main concern is the project cost	unending dedication is a must	eco-social	security of data	equipment readout	planning and tracking is a critical pi	keep all parties informed (2)
goals need to be met	or I would have given up a long time	not the simple thought associated	EMR records (4)	we need state of the art	organized team leaders	teach
budget approval needs a push	time and energy commitment	integrated social programs	HIPPA (2)	plan what tech is needed in phases	project managers who communicat	help the people help themselves
the entire group needs to be more c	administration leads the communit	sustainable health program	data needs to be timely	each department submits tech need	work wall with city planning	answer their questions
clinicians who define the program g	keep all parties informed (2)	health services	know how to use the data	we work with the tech teams to app	manage to the priorities	online website to learn more
clinicians who define the program g	organized team leaders	sustainability policy	get access to the data	systems and support for the health	project tracking	online learning
county experts	leaders need to communicate clear	clean water	healthcare terms to analyse the da	monitors	we need to plan for it	need to know
the data owners	we can't have breach of security by	water conservation	collect the right data (3)	sensors	new requirements	programs to roll out
CMO talks to one person at a time	confidential	water shortage	send or share the information	solar	track each team	public participation
participate and lead the change		ecological	front end data access	water management		voting
volunteers who want to help		apply green energy concepts	baseline information	transportation		volunteers need to know first
too many people to account for all the time		sustainable program	analyze data	technology integrated		experts on each project
we can't have breach of security by a team member		prevention healthcare	ICT	online website to distribute information		
someone has to own it and do it			IOT is everywhere now and we need to plan for it as a new requirement			
			analytics			
			program data collection			
			statistical analysis			

Appendix F. IBM Smart Cities




People 4 Smarter Cities
Home
Ideas & Insights
Contribute
About
Log in as a Citizen or Leader
Find Ideas
Sort by :
Recent
Popular
From :
IBM
Editorial highlights
Community
Topic :
All Topics
Buildings
Education
Energy & Water
Environmental
Government
Healthcare
Public Safety
Why Big Data Means Better Outcomes for...
Stephen Taylor,...
Paris, Ile-de-France, France
0
0
Government
Three Healthcare Ideas That Keep Citizens...
Stephen Taylor,...
Paris, Ile-de-France, France
0
0
Healthcare

Appendix G. City of San José Urban Village

Green Vision of San José

The Green Vision for San José states that by the year 2022, the City of San José, in tandem with its residents and businesses, will:

Goal 1: Create 25,000 Clean Tech Jobs

Goal 2: Reduce Per Capita Energy Use by 50%

Goal 3: Receive 100% of Our Electrical Power from Clean, Renewable Energy Sources

Goal 4: Build or Retrofit 50 Million Square Feet of Green Buildings

Goal 5: Divert 100% Waste from Landfill and Convert Waste to Energy

Goal 6: Recycle or Beneficially Reuse 100% of Our Wastewater

Goal 7: Adopt a General Plan with Measureable Standards for Sustainable Development

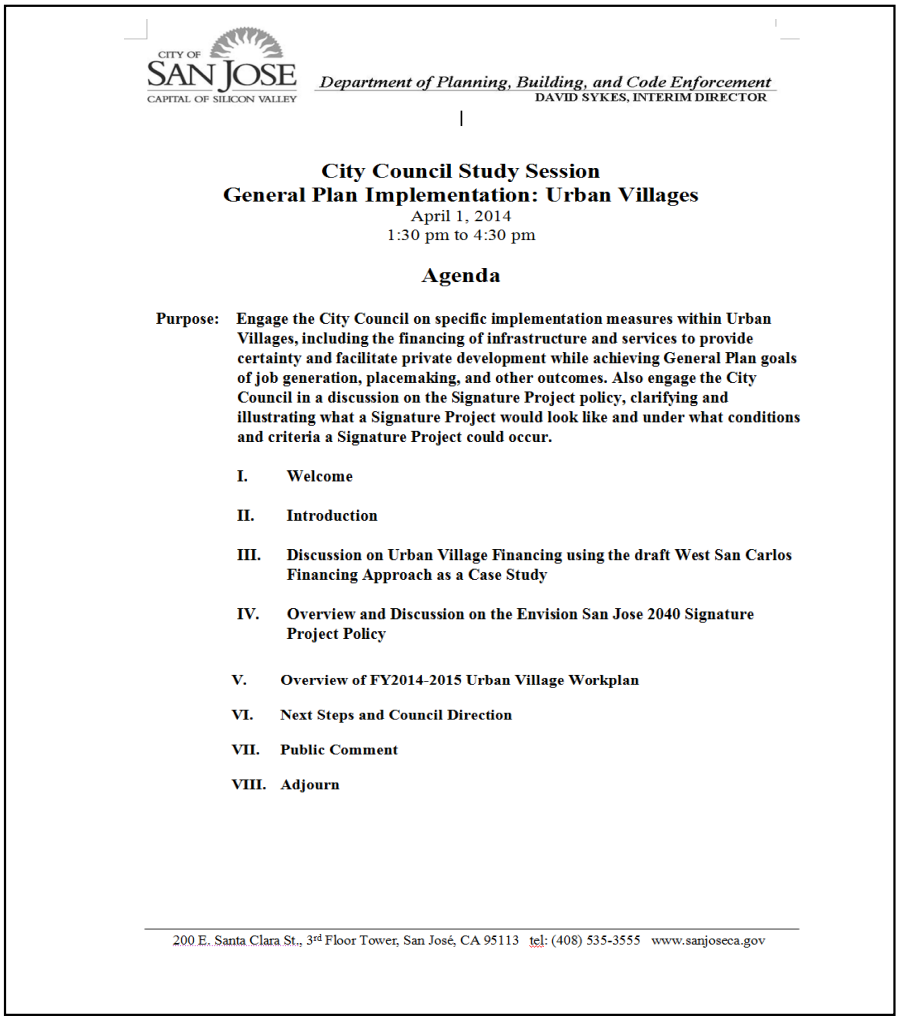
Goal 8: Ensure that 100% of Public Fleet Vehicles Run on Alternative Fuels

Goal 9: Plant 100,000 Trees and Replace 100 % of Streetlights with Zero Emission Lighting

Goal 10: Create 100 Miles of Trails Connecting with 400 Miles of On-Street Bikeways

(City of San José, California, 2007)

Appendix G. City of San José Urban Village (*continued*)



CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building, and Code Enforcement
DAVID SYKES, INTERIM DIRECTOR

City Council Study Session
General Plan Implementation: Urban Villages
April 1, 2014
1:30 pm to 4:30 pm

Agenda

Purpose: **Engage the City Council on specific implementation measures within Urban Villages, including the financing of infrastructure and services to provide certainty and facilitate private development while achieving General Plan goals of job generation, placemaking, and other outcomes. Also engage the City Council in a discussion on the Signature Project policy, clarifying and illustrating what a Signature Project would look like and under what conditions and criteria a Signature Project could occur.**

I. **Welcome**

II. **Introduction**

III. **Discussion on Urban Village Financing using the draft West San Carlos Financing Approach as a Case Study**

IV. **Overview and Discussion on the Envision San Jose 2040 Signature Project Policy**

V. **Overview of FY2014-2015 Urban Village Workplan**

VI. **Next Steps and Council Direction**

VII. **Public Comment**

VIII. **Adjourn**

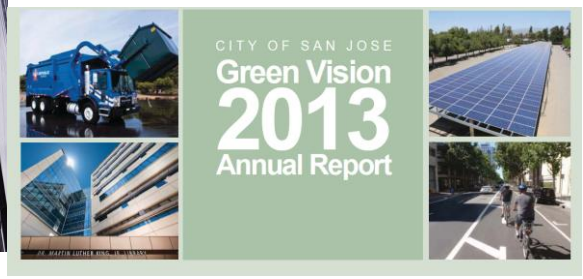
200 E. Santa Clara St., 3rd Floor Tower, San José, CA 95113 tel: (408) 535-3555 www.sanjoseca.gov

Appendix G. City of San José Urban Village (*continued*)

Appendix G. City of San José Urban Village (*continued*)

City of San Jose, California

PROSPECT Silicon Valley
PARTNER TO CLEAN TECH INNOVATORS



Appendix G. City of San José Urban Village (*continued*)

Goal 1: Create 25,000 new Clean Tech jobs as the World Center of Clean Tech Innovation

San José Ranked #1 in the U.S. Metro Clean Tech Index

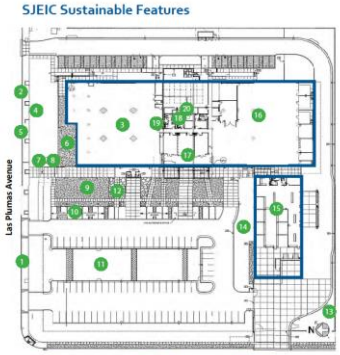
Over $8 billion in venture capital funding for Clean Technology in Silicon Valley since 2007.

Learn more...

Creating New Jobs By Growing the Clean Tech Economy

It will take significant creativity and innovation to move the cities and countries of the world toward a more sustainable environment, just as it did to move the world from the industrial age into the age of silicon and high tech. More so than any region of the world, San José and Silicon Valley are defined by the ability and willingness to innovate and change. From the defense technologies of World War II, the semiconductors and

SJEIC Sustainable Features



San José Environmental Innovation Center
Sustainable Features Corresponding to Numbers on Map

1. LED Lights
2. Silva Cells™ (tree root system)*
3. Solar Tracking Skylights
4. Recycled Water Pipes*
5. Pervious Pavement
6. Smart Irrigation System*
7. Wind Turbines
8. Solar Panels
9. Drought Tolerant Plants
10. Vehicle Charging Stations
11. Modular Wetland*
12. Recycled Concrete
13. Bioswales
14. Public Art Feature
15. Cool Roof*
16. Solar Light Tubes
17. Low VOCs
18. Dual Flush Toilets, Waterless Urinal, and Low-Flow Faucets
19. Reclaimed Wood
20. Interior Composting Toilets

- Full descriptions on other side -

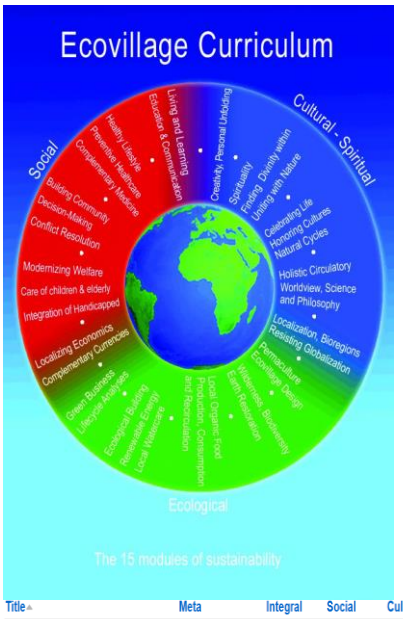
*Feature is not visible

SJEIC – Phase I

- Construction Started June 2009
- Construction Completed June 2010
- Construction Costs - $1.8M
- Scope
  - Demolition
  - Grading
  - Storm Drainage
  - Landscape and Irrigation
  - Construction of a Parking Area
  - Frontage Improvements along Las Plumas Avenue
  - Stormwater Features:
    - Bioretention Swale
    - Modular Wetland
    - Pervious Paving
    - Porous Paving
    - Silva Cells

Appendix H. Thailand On Tai Ecovillage

Appendix I. Global Ecovillage Network (GEN)



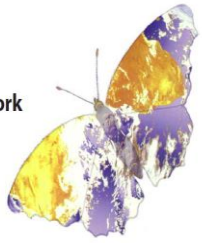
Title	Meta	Integral	Social	Cultural	Ecologic	Economical
		50%	45%	50%	50%	50%
Accès à l'eau pour un développ	Permaculture Project, Under construction, Morocco	68%	92%	71%	85%	86%
Agroturismo,Ecoturismo,Permacultura	Cooperative, Initiative, Europa, Iberian Peninsula, Spain, Valencia	88%	84%	50%	100%	71%
Aldeia, family collective	Ecovillage, Established, Brazil	100%	88%	97%	90%	96%
AnotherLand	Ecovillage, Under construction, China	80%	70%	75%	97%	60%
Arca Verde	Ecovillage, Established, Brazil	78%	73%	83%	91%	94%
Arterra Bizimodu Ecoaldea	Sustainable settlement, Established, Iberian Peninsula	75%	42%	50%	50%	50%
Ashoka Ecovillage - Cambodia	Ecovillage, Under construction, Cambodia	25%				
Atamai Village	Ecovillage, Established, New Zealand	72%	73%	57%	85%	70%

Global Ecovillage Network

COMMUNITY SUSTAINABILITY ASSESSMENT (CSA)

Developed by the Global Ecovillage Network

www.gaia.org



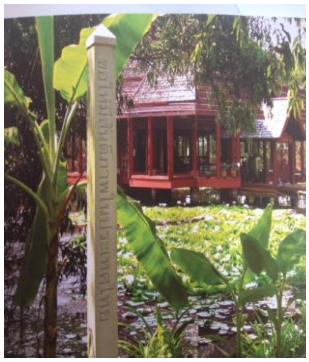
HOW SUSTAINABLE IS YOUR COMMUNITY?

Introduction

The Community Sustainability Assessment is a comprehensive checklist that anyone can complete to get a basic idea of how sustainable their community is. This assessment tool is applicable to any community. While it requires good knowledge of the life-styles, practices and features of the community, it does not require research, calculation and detailed quantification. This assessment takes about two-three hours for an individual to complete, or several times that if done as a group experience by community members.

General Instructions

The Community Sustainability Assessment (CSA) was developed to assist communities in assessing



Appendix J. Gaia Trust

Gaia Trust

Research interview pictures with Ross and Hildur Jackson

Gaia Trust's strategy has always been two-pronged with yin and yang components. The yin component was to support the ecovillage movement through grants, while the yang component was to invest its capital in "green" startup companies that would complement the grants policy, creating jobs and promoting more sustainable businesses.

The major projects resulting were the establishment of the Global Ecovillage Network and venture capital firm Gaia Technologies A/S. Over 300 grants have been made to projects in over 30 countries. One of the key concepts was to support the first permaculture course in a number of countries.

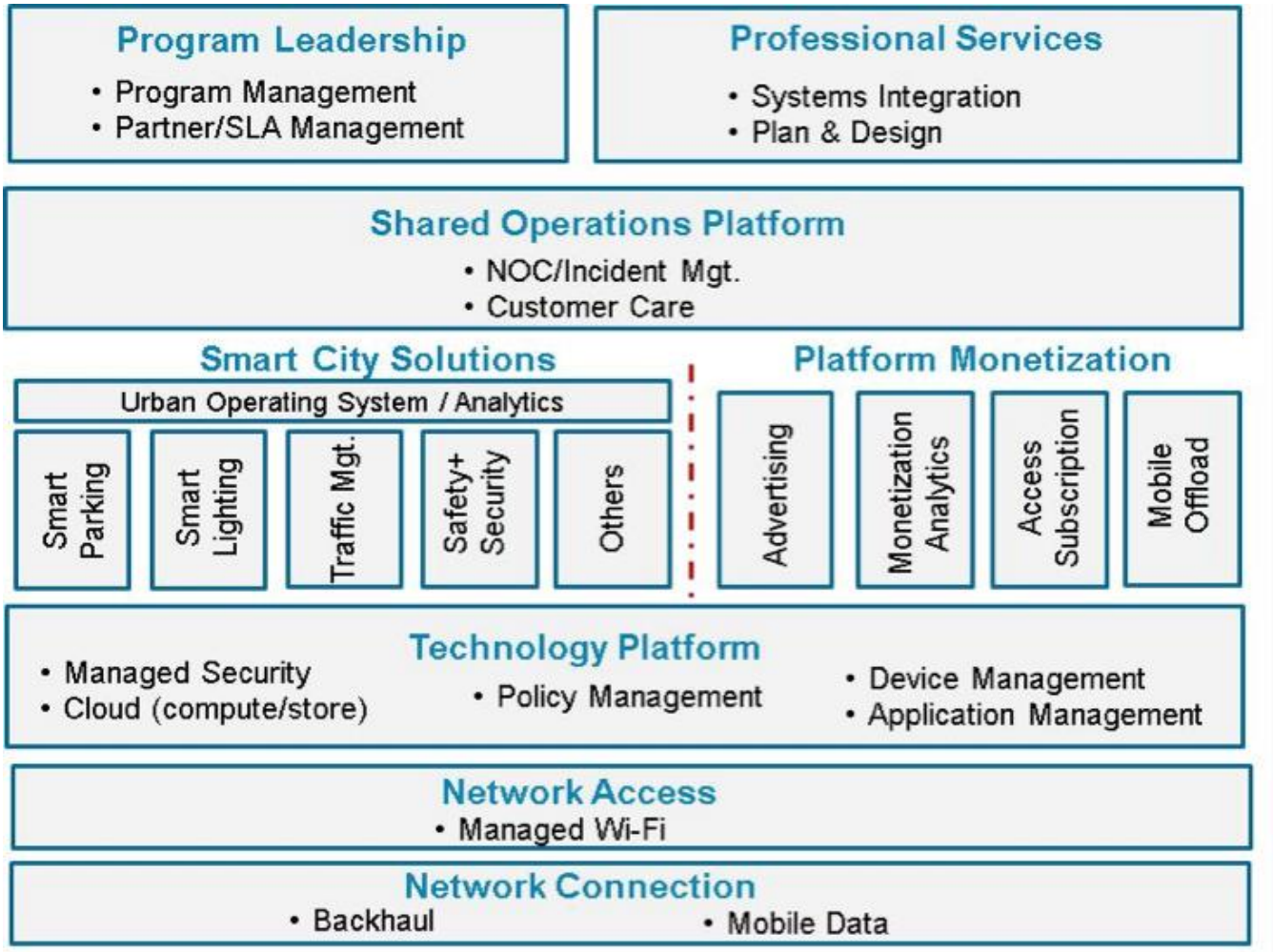
Appendix K. Academic and Practitioner Groups

A table of additional academic and practitioner reference groups and websites gathered from participants during my action research. The message of a “smarter” world can be observed in cities, airports, newspaper articles, and magazines, but the in-depth leadership knowledge (Yang, Huang and Hsu, 2014) on how to define, design, and deliver projects runs a spectrum of models. The common threads of change management, technology, and stakeholder commitment are all present in projects.

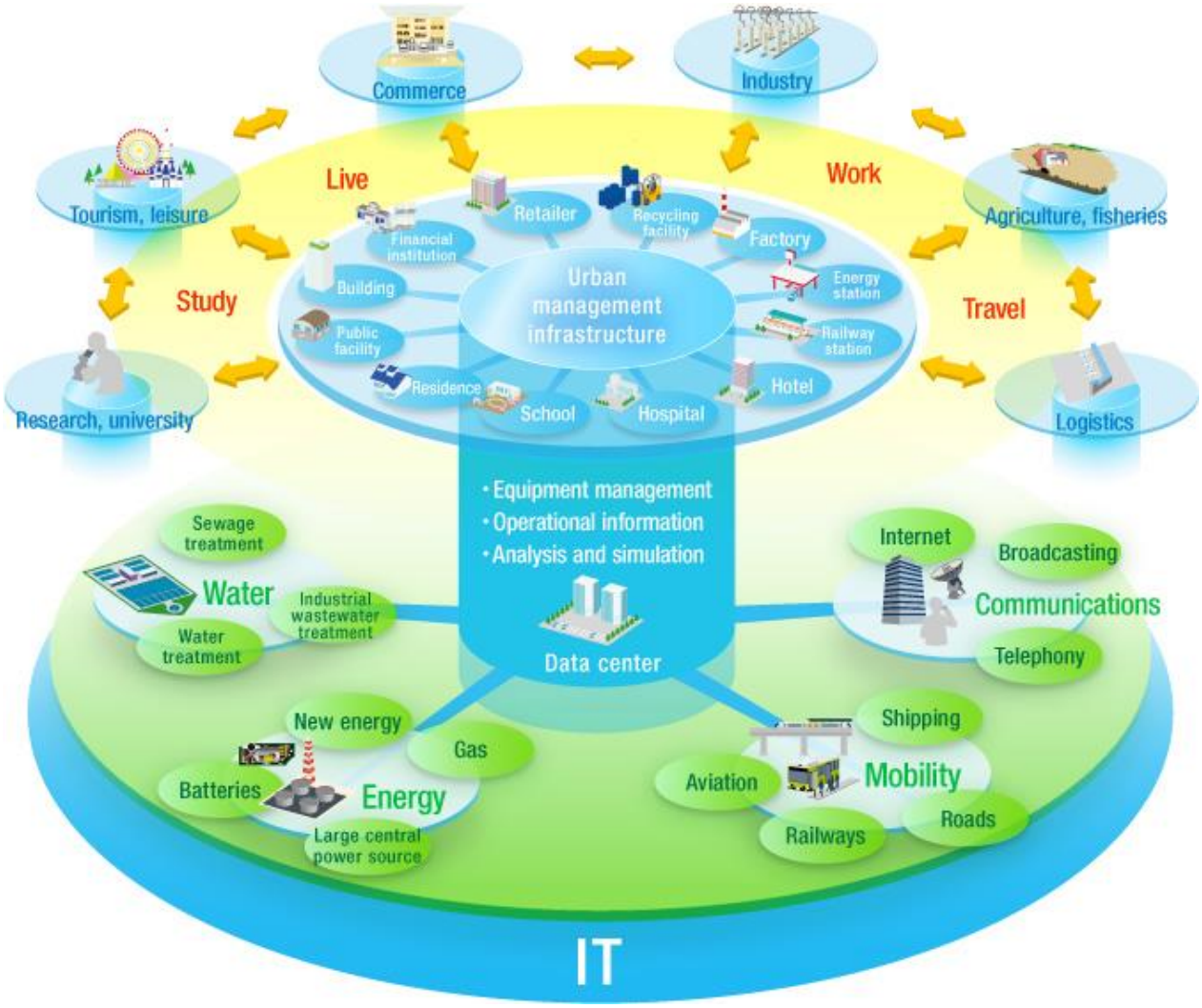
Resources	Web Link
World Foundation for Smart Communities	http://www.smartcommunities.org/
Global Ecovillage Network (GEN)	http://gen.ecovillage.org/
Gaia Education	http://www.gaia.org/gaia/education/
Gaia Trust	http://www.gaia.org/gaia/gaiatrust/
Ecovillage Transition Asia	http://ecovillagetransition.org
UNDP	http://www.undp/org
UNDPI	http://outreach.un.org/ngorelations/
City of San José Mayor's office	http://www.sanjoseca.gov/index.aspx?NID=1365
Fellowship for Intentional Community	http://gen.ecovillage.org/
City of San José	http://www.sanjoseca.gov/
United States Conference of Mayors	http://www.usmayors.org/
IBM Smart Cities	http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/
City Mayors - Running the World's Cities	http://www.citymayors.com/
European Commission Smart Cities and Communities	http://ec.europa.eu/eip/smartcities/about-partnership/how-do-i-get-involved/index_en.htm
Prospect SV	http://prospectsv.org/
URENIO (Urban and Regional Innovational Research)	http://urenio.org
Linked In - Group GREEN CITIES, SMART CITIES and City 2.0 LinkedIn Group - Smart Government and City Administration	www.linkedin.com
Hitachi	http://www.hitachi.com/products/smartcity/vision/concept/index.html
Cisco	http://www.cisco.com/web/strategy/smart_connected_communities.html
Covenant of Mayors Committed to Local Sustainable Energy	http://www.eumayors.eu/Associated-Partners,263.html

Appendix L. Cisco Smart City Business Architecture Map

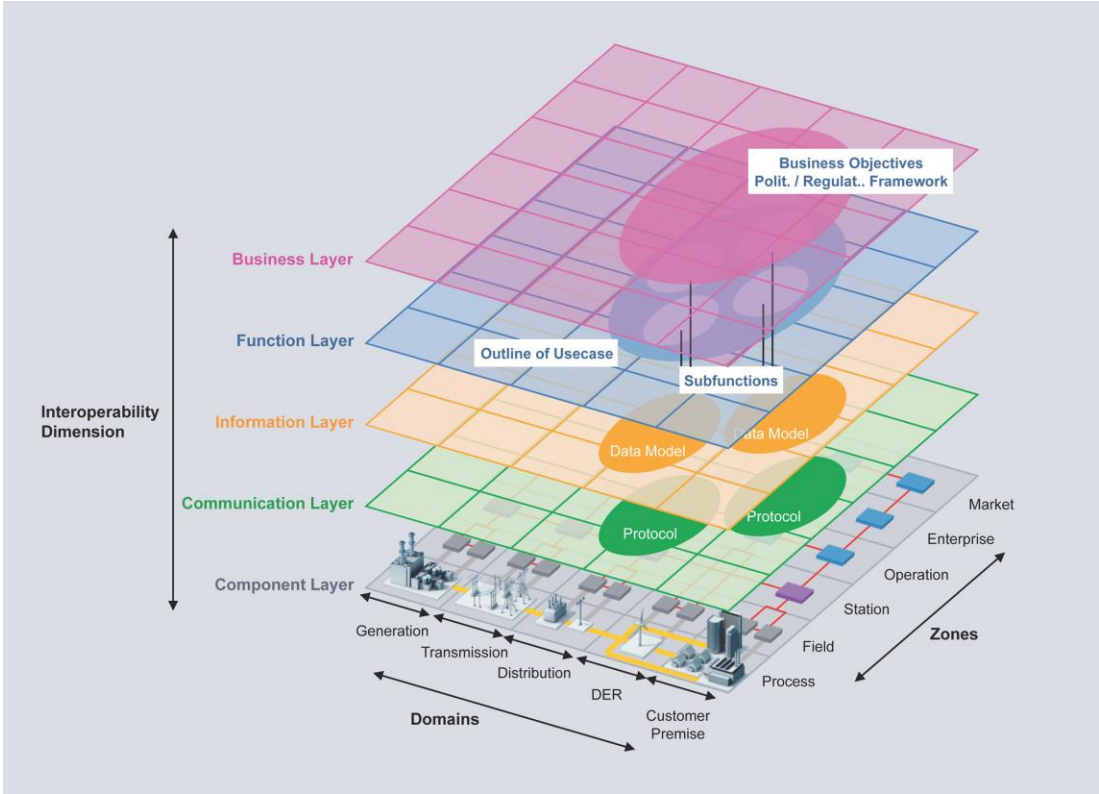
Cisco outlines their version of a smart city business architecture. On analysis, it is clear that each component can require multi-stakeholder management and integration with other components and the holistic architecture is a large-scale, all-inclusive project.



Appendix M. Hitachi Smart City IT Architecture



Appendix N. Siemens Smart City IT Architecture Overview



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